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BRITISH MUSEUM
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NATURAL HISTORY.

— PROCEEDINGS —

OF THE

Bournemouth Natural Science Society.

VOL. XIX.

SESSION, 1926-27.

PROCEEDINGS of the

Bournemouth Natural Science Society.

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PUBLISHED BY THE SOCIETY AT ITS HOUSE,
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BRITISH MUSEUM
NATURAL HISTORY

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Introductory Note.

THE Bournemouth Natural Science Society was founded in 1903, being the successor to an older society which was formed in 1883 and dissolved in 1897. The early meetings of the Society were held in a room hired from time to time for the purpose, but the need of some fixed quarters was soon felt. To meet this need a small room was taken at 122 Old Christchurch Road, and, as this proved inadequate, in February, 1909, better accommodation was secured at Granville Chambers and retained for four years. In March, 1913, the Society took on lease from the Education Committee a large room on the ground floor of the Municipal College. In 1919 this also had to be given up, and the Society succeeded in acquiring a house of its own, 39 Christchurch Road. The formal opening was on February 7, 1920.

The objects of the Society are declared by the second of its rules to be "the promotion of the study of Science in all its branches, by means of Lectures, Field Meetings, the Reading and Discussion of Papers, and the formation of Sections of its members devoted to any particular branch of the Society's work, and in any way that the Council of the Society shall deem advisable."

The Sections at present working are as follows:— **Archæological and Historical, Botanical, Entomological, Geographical, Geological, Microscopical, Photographic and Record, Physical, and Zoological.**

During the WINTER SESSION, from October to April, GENERAL and SECTIONAL MEETINGS are held, comprising Lectures and Demonstrations on subjects of scientific interest, illustrated by lantern slides, diagrams, specimens or experiments.

All meetings are open to all members of the Society.

Throughout the SUMMER SESSION, EXCURSIONS to places of interest in the neighbourhood are arranged and indoor or garden meetings occasionally held.

The management of the Society is vested in a Council, which is elected at the Annual General Meeting, held in October.

The Society possesses a Library available for the use of members. This is yearly becoming more extensive and valuable by the acquisition of standard text books and of books dealing with matters of local scientific interest. Books may, under certain conditions, be borrowed by members, and there is a Reading Room in which works of reference may be consulted.

The Society's collections of archæological, botanical, geological, zoological and other specimens are now arranged in the MUSEUM. Articles on the collections were contributed to Vols. V. X. and XVII. of the Proceedings by Sir Daniel Morris, Mr. W. G. Wallace and Rev. C. O. S. Hatton respectively.

Members are elected by the Council and pay an annual subscription of £1 for full membership (admitting to all meetings and excursions for the year), a subscription of £2 covers four adult members of the same family residing in the same house.

A MONTHLY NOTICE, giving full details of all meetings, etc., is posted to every member before the beginning of each month, and a volume of Proceedings is published every year.

Application Forms for Membership, and further particulars, can be obtained from the

HON. SECRETARY,

Bournemouth Natural Science Society,
39, Christchurch Road,
Bournemouth.

Bournemouth Natural Science Society.

OFFICERS AND COUNCIL FOR 1926-27.

President

HEYWOOD SUMNER, F.S.A.

Vice-Presidents

HENRY BACKHOUSE, F.R.H.S.
G. E. J. CRALLAN, M.A., M.B., M.R.C.S.
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CLAUDE LYON
H. PAINTER, B.SC., F.C.S.
F. G. PENROSE, M.D., F.R.C.P., F.Z.S., M.B.O.U.
R. V. SHERRING, F.L.S.
SIR DANIEL MORRIS, K.C.M.G., J.P., M.A., D.SC., D.C.L., LL.D., F.L.S.

Chairman of Council

J. H. RALPH SMYTHE, J.P.

Deputy-Chairman of Council

REV. C. O. S. HATTON, B.A., F.L.S.

Council

THE OFFICERS AND CHAIRMEN OF SECTIONS (ex-officio)
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J. B. HURRY, M.A., M.D.
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MISS S. G. ROOKE
J. H. SCOTT, M.E., M.I.M.C.E.
R. V. SHERRING, F.L.S.
REV. F. J. DOUGLAS SIMPSON, M.A
J. H. RALPH SMYTHE, J.P.
J. F. SPENCER
W. J. WOODHOUSE

Chairmen of Sections

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Botanical: REV. C. O. S. HATTON, B.A., F.L.S.
Entomological: HOWARD LACEY, B.A.
Geographical: CLAUDE LYON.
Geological: HENRY BURY, M.A., F.L.S., F.G.S.
Microscopical: F. B. TAYLOR, B.A.
Photographical and Record: W. DIESELHORST, A.M.I.C.E
Physical: HUBERT PAINTER, B.SC., F.C.S.
Zoological: F. G. PENROSE, M.D., F.R.C.P., F.Z.S., M.B.O.U

Hon. Treasurer

G. BRUMELL, A.R.I.B.A., Maori, 15 Richmond Park Avenue.

Secretaries

Hon. Secretary: REV. A. G. YATES, M.A., R.N., 14 Wellington Road. to whom all official correspondence should be addressed.
Hon. Assistant Secretary: W. J. WOODHOUSE, A.C.P., M.I.H., 35 Chatsworth Road.
Assistant Secretary: J. F. SPENCER, Glenthorne, Richmond Park Road.

Hon. Librarian

CLAUDE LYON, Shalimar, Wilderton Road.
Hon. Assistant Librarian: MISS A. G. VEALE, 2 Richmond Park Crescent.

Hon. Editor

J. R. WHITE, M.A., Whitecot, Linwood Road

Hon. Curator

REV. C. O. S. HATTON, B.A., F.L.S., Hinton Vicarage, Christchurch.

Hon. Auditors

E. BICKER. C. H. BLACKETT.

Bankers

NATIONAL PROVINCIAL BANK OF ENGLAND, BOURNEMOUTH.

BRITISH MUSEUM
10 MAR 31
NATURAL HISTORY.

List of Members.

Revised to 7th November, 1927.

* Honorary Members. † Past Presidents. o Original Members.
G Morris Gold Medallist. A Associate Members.
The year of election is given before the name of each member.

A

1927	Addison, G. G. L.	95 Lowther Road
1927	Addison, Mrs.	" "
1927	Adkins, H.	Glenavon, 107 Alumhurst Road
1927	Alexander, Miss M., M.A.	Abbotslea, 5 Surrey Road
1924	Amos, Miss E.	Langley Dene, 55 Wellington Road
1927	Anderson, A. R., C.B.E., F.R.C.S.	11 Boscombe Spa Road
1927	Anderson, Mrs.	" "
1920	Anderson, Col. E. B., C.B.E.	Woodmanton, 35 Wellington Road
1922	Anderson, Col. R. F.	Glenalmond, 5 Madeira Road
1923	Anderson, Mrs.	" " "
1923	Anderson, Mrs. M.	Ranfurly, 18 Dean Park Road
1914	Andrews, W.	44 Talbot Road
1926	Aston, G. R.	The Fairway, Mountbatten Road
1921	Aston, Mrs.	" " "
1911	Atkins, Mrs.	10 Fortescue Road
1924	Attwell, A. F., M.P.S.	17 Hamilton Road
1926	Audain, Mrs. N. M.	Tregonwell Towers

B

1906	Backhouse, H., F.R.H.S.	Sundridge, Grove Road
1927	Ball, W. T., O.B.E.	7 Portman Crescent
1922	Barker, S.	66 West Cliff Road
1921	Barker, Miss W.	" "
1905	Barlow, E. W., B.SC., F.R.A.S., F.R. MET. S.	Greengates, Wadhurst, Sussex
1912	ABarraclough, A., M.A., F.R.G.S.	173 Richmond Park Road
1909	Barratt, J. Hayes	Brundon, 2 Surrey Road
1924	Barratt, Mrs.	" "
1924	Barratt, Miss P. M.	" "
1905	Bartlett, H. F. D., F.E.S.	Island of St. Helena, South Atlantic
1920	Bartlett, P. R.	35 King's Park Road
1927	Bater, G. W.	22 Dingle Road
1927	Bater, Mrs.	" "
1927	Bater, Miss K. J.	" "
1925	Beale, Mrs. J. B.	Deep Dale, 41 Surrey Road
1918	ABeaumont, Miss E. J.	12 Sunnyhill Road, W. Southbourne
1923	Bell, Major J. G.	Ivanhoe, Sandringham Road, Parkstone
1927	Bell, S.	Bromlea, Leicester Road
1927	Bell, Mrs.	" " "
1923	Benest, Mrs. A. S.	Tijuca, 54 Wellington Road
1904	Bennett, H. Morden	Sweet Briar, 12 Derby Road
1920	Bennett, Risdon, M.A.	Yew Tree Cottage, Broadstone
1927	Benny, L. C., M.A., B.SC., F.R.A.S.	Municipal College.
1921	Bevan, F. M.	17 Stirling Road
1923	Bishop, E.	21 Surrey Road

1912	Blackall, Miss E. E.	10 Harcourt Road, Boscombe Park
1908	Blackett, C. H.	Ladbroke, Chine Crescent
1910	*Bond, F. Bligh, F.R.I.B.A.	454 Gloucester Road, Bristol
1920	Borrett, Surgeon Capt., G. G., R.N.	62 Alum Chine Road
1924	Borrett, Mrs.	,, ,,
1924	Borrett, Miss J.	,, ,,
1925	Borrow, Frederick	The Knoll, Charminster Road
1925	Borrow, Mrs.	,, ,,
1924	Bottomley, Miss O.	Langley Dene, 55 Wellington Road
1920	aBourne, Miss C. M.	56 Sunny Hill Road, West Southbourne
1927	Boyce, C.	Compton Cottage, Canford Cliffs
1927	Boyt, Miss J.	1 Ascham Road
1914	Bradbury, Miss E.	La Bocca, 2 Portarlington Road
1925	Bradley, F. L.	Holmwood, 12 Chine Crescent Road
1924	Bragg, Miss H. B.	4 Chester Road
1924	Bragg, Miss R.	,, ,,
1924	Bragg, Miss S. B.	,, ,,
1908	Brazier, J. J.	Fairlawn, 48 Lowther Road
1922	Brewitt-Taylor, Mrs. Ray	Branksome Lodge, 6 Forest Road, Branksome Park
1926	Broad, F.	Manton Villa, Oxford Road
1921	Bromley, Miss	81 Lansdowne Road
1917	Brown, Edward	West Ridge, Chessel Avenue
1917	Brown, Mrs.	,, ,,
1926	Brown, Lt.-Col. F. Tatton	Talbot Hurst, 3 Branksome Hill Road
1924	Brown, Miss E.	Chobham House, 4 St. Winifred's Road
1924	Brown, Miss E. S.	,, ,, ,,
1924	Brown, Miss F.	,, ,, ,,
1923	Browne, John	Serantes, Glen Road, Boscombe
1924	Browning, Miss E. M.	Littleholm, Ferndown
1905	Brumell, G., A.R.I.B.A.	Maori, 15 Richmond Park Avenue
1920	Brumell, Mrs.	,, ,, ,,
1923	Brumell, F.	,, ,, ,,
1920	Brumell, Miss M.	,, ,, ,,
1920	Bryant, Miss M.	Sunnyhill, Hampden Lane, W. Southbourne
1907	Bulfin, Ignatius, B.A.	The Den, 26 Knole Road
1908	Bulfin, Mrs.	,, ,,
1924	Burgess, J.	Kempston, Chine Crescent Road
1927	Burrell, Mrs. A. E.	Freydan Lodge, Poole Road
1924	Burroughs, F. G.	63 Maxwell Road
1919	Burstal, E., M.D.	46 Lansdowne Road
1926	Burstal, E. K., M.I.C.E.	27a Grove Road
1926	Burstal, Mrs.	,, ,,
1922	Burton, E. St. John, F.Z.S., F.G.S.	Melville, 4 Howard Road
1927	Burton, Stewart	Dunmere, 17 Eaton Road
1922	Bury, Henry, M.A., F.L.S., F.G.S.	The Gate House, 17 Alumdale Road

C

1910	Cameron, Miss	Little Forest House, 19 Bath Road
1924	Campbell, Mrs.	Pinehurst, Broadstone
1924	Cardell, G., L.D.S.	Exeter House, The Square
1919	Cardew, R. K., B.A.	Stafford Lodge, 26 Dean Park Road
1920	Cardew, Mrs.	,, ,, ,,
1926	Carson, J.	2 Pentilie, Alumhurst Road
1912	Carus-Wilson, C., F.R.S., Edin., F.G.S.	Altmore, Waldegrave Park, Strawberry Hill, Middlesex, and Royal Societies' Club, S.W.

1927	Castell, Mrs.	62 Wellington Road
1927	Chidell, Miss	Rockmount, St. Michael's Road
1925	Chilver, Mrs. E. K.	2 Shaftesbury Road
1912	AChilver, Miss K. M.	,, ,,
1927	Christy, R. W.	Greyfriars, Ringwood
1926	Clare, Mrs.	48 Queen's Park West Drive
1922	Claridge, J. E. W., LL.C.M.	52 Old Christchurch Road
1911	Clark, Walter Child	Michelgrove House, Boscombe
1927	*Clay, R. C. C., M.D., F.S.A.	The Manor House, Fovant, Wilts
1908	Coddington, E. F.	34 Irving Road
1921	Colborne, E. A.	11 Cambridge Road
1911	Collins, W. F.	Vellore, Overcliff Drive
1912	Cooper, Ernest	100 Old Christchurch Road
1909	Cooper, J. Omer, F.E.S.	Zoological Laboratory, New Museums, Cambridge
1927	Cooper, Miss Marion	Lymers Ley, Byron Road, Boscombe
1908	Cooper, Rev. W. H. Windle, M.A., F.R.G.S., F.R.H.S.	Owthorpe, 21 Branksome Wood Road
1926	Cooper, H. A.	25 Talbot Avenue.
1926	Cooper, Mrs.	,, ,,
1926	Cooper, A. H.	,, ,,
1926	Cooper, Miss S. I.	,, ,,
1926	Cooper, J. S.	The Little Red House, Colehill, Wimborne
1916	Cowell, G. E.	Hawthorns Hotel, West Cliff Road
1903	†oCrallan, G. E. J., M.A., M.B., M.R.C.S.	St. Cross, 13 Bodorgan Road
1922	Crallan, Mrs.	,, ,,
1920	Cressy, Miss H.	Bramcote, 1 Glen Road, Boscombe
1927	Cripps, C. Couper, M.D., M.R.C.S.	14 Dean Park Road
1927	Cripps, Mrs.	,, ,,
1922	Crowther, Miss V.	Berwyn Bank, Poulner Hill, Ringwood
1913	Curme, Mrs.	New Bohemia, 1 Nelson Road
1922	Curme, Miss E. M.	,, ,,
1903	oCurtis, W. Parkinson, F.E.S.	Drake North, Sandringham Road, Parkstone
1922	*Elected an Honorary member	

D

1927	Dacombe, J. M. J.	27 Holdenhurst Road
1920	Darke, Miss W. E.	25 Hawkwood Road, Boscombe
1921	aDavies, Miss H. V., B.SC.	Municipal College
1927	Davies, E. A.	25 Marlborough Road
1927	Davies, Mrs.	,, ,,
1927	Davies, Miss M.	,, ,,
1927	Davies, Miss V. L.	,, ,,
1919	Davison, Miss L.	15 Dean Park Road
1926	Dawson, Miss L. N.	Miranda, 20 Carbery Avenue
1924	Deas, J., M.A., I.C.S.	57 Wellington Road
1918	Dence, Miss F. M.	Birk House, Wollstonecraft Road
1926	de Paiva, Miss E.	Sunny Halt, Hamilton Road, Boscombe
1914	Dickson, Col. W. D., J.P.	Southill, 32 Dean Park Road
1914	Dickson, Mrs.	,, ,,
1919	Dieselhorst, W., A.M.I.C.E.	50 Surrey Road
1924	Dieselhorst, Mrs.	,, ,,
1903	o*Dixon, J. R. L., M.R.C.S., L.R.C.P.	
1920	Dodd, Col. J. R., M.D., F.R.C.S.	140 Richmond Park Road
1921	Dodd, Mrs.	,, ,,
1921	Dodd, T. A.	,, ,,
1910	Dodshon, E., LL.B.	126 Old Christchurch Road

1926	Dodwell, Mrs. L. B.	Crendon, Carbery Avenue, West Southbourne
1923	Druitt, Alan	Willow Lodge, Mudeford, Christchurch
1923	Druitt, Mrs.	,, ,, ,, ,,
1904	Druitt, J., J.P.	Avebury, 10 Madeira Road
1925	Druitt, Miss C. M.	,, ,, ,,
1925	Druitt, Miss C. S.	,, ,, ,,
1926	Dundee, Mrs. A. E. M.	Landi Kotal, Roseville Street, Jersey
1921	Dunn-Gardner, R. C.	15 Queensbury Place, S. Kensington, S.W. 7
1924	aDyer, Miss G. B.	Victoria Home School, 37 Burnaby Road

E

1926	Eastwood, Mrs. G. B., F.L.S.	Heathlands, East Cliff
1924	Edwards, Miss M. J.	Aysgarth, 16 Poole Road
1923	Ellen, Miss D. M.	Staunton, Exeter Park
1922	Ellis, Mrs.	6 Forest Road, Branksome Park
1922	Ellis, Miss W. M.	,, ,, ,, ,,
1923	Elrington, R.	Mavis Bank, 15 Bodorgan Road
1923	Elrington, Mrs.	,, ,,
1922	Elwes, Mrs.	Burnt Hill, Broadstone, Dorset
1924	Ensor, Major F. W., M.A., B.C.L.	26 Frederica Road, Winton
1924	Ensor, Mrs.	,, ,,
1909	Evans, P. H. L., M.A.	Stirling House, 28 Manor Road
1927	Exon, C., M.A.	Aldermoor, Douglas Road, Southbourne

F

1924	Faber, W., F.Z.S.	Midwood, 64 Christchurch Road
1920	Fairbrother, Miss L.	Knole Hall High School for Girls, Knyveton Road
1921	Fane, F. L.	13 Littledown Road
1921	Farmar, Miss D. A.	Dorset Lodge, 10 Suffolk Road
1919	Farmar, Mrs. K. A.	Whitton Lodge, Stevenson Crescent, Parkstone
1922	Farmar, Miss E. A.	,, ,, ,, ,,
1914	Fielding, T., M.D.	Genesta, West Hill Road
1927	Finlinson, F. J.	Daneshill, Queen's Park Avenue
1927	Finlinson, Miss D. C.	,, ,, ,,
1903oA	Firbank, Miss, LL.A., A.C.P.	5 Buchanan Avenue
1927	Folkard, W. W.	Twyford, West Moors
1922	Fonblanque, Miss Ida	4 Gordon Road
1917	Forrest, Mrs.	The Cottage, Benellen Towers, Branksome Wood Road
1927	Foster, W. J., F.R.C.S.	53 Browning Avenue, Boscombe
1927	Foster, Mrs.	,, ,,
1925	Fountain, E. D., L.R.C.P., M.R.C.S.	Vron, 30 Mansfield Road, Parkstone
1925	Fountain, Mrs.	,, ,, ,, ,,
1922	Fowler, A. R. W., B.A.	St. Ina, Beechwood Avenue
1922	Fowler, Mrs.	,, ,, ,,
1919	Fowler, Miss M.	Lerryn, Chessel Avenue
1925	Fowler, Miss R.	,, ,,
1924	Freer, Miss L. W.	1 Branksome Park Avenue
1927	French, F. W.	1 Ascham Road
1927	French, Miss J. E.	,, ,,
1909	French, J. M.	Jumpers House, Christchurch
1926	Frost, John	The Manchester, S. Michael's Road
1923	Fryer, Miss C. H.	Moulton, 46 Wellington Road

G

1922	Gardiner, Miss F. M.	3 Adeline Road, Boscombe
1926	Gardiner, H. L.	,, ,,
1917	Garnett, H. A.	18 Campbell Road, Boscombe
1917	Garnett, Mrs.	,, ,,
1922	Gatty, Lady K.	Ossemsley Manor, Christchurch
1922	Gatty, Miss H.	,, ,,
1922	Gatty, Oliver	,, ,,
1922	Gatty, Richard	,, ,,
1924	George, Miss M.	3 Balmoral, West Hill Road
1923	Gibbs, F. L. A.	Hawthorns Hotel, West Cliff Road
1921	Gibbs, G. F.	Fairview, 13 Herbert Road
1914	Gill, Edwin R., A.R.C.A.	Rosslyn, Seldown, Poole
1925	Gill, Miss Ida	,, ,, ,,
1922	Gill, Major W. R.	Chewton Lodge, Highcliffe
1923	Gill, Mrs.	,, ,, ,,
1924	Goddard, Rev. C. V.	62 Parkwood Road, Boscombe
1925	Godman, G. W.	Beech House, Bransgore, Christchurch
1925	Goodacre, Rev. C. B.	3 Cecil Road, Boscombe
1924	Goode, Mrs.	50 Surrey Road
1927	Gorton, B., M.R.C.V.S., M.P.S.	22 Arnewood Road
1921	Gosse, W., M.D., D.P.H.	Hope Lodge, Belle Vue Road, Parkstone
1904	Gray, Arthur	Woodville, 26 Melville Road, Winton
1911	Gray, Mrs.	Darena, 15 Wellington Road
1921	Greg, Mrs.	Fuji Yama, 9 Hengist Road
1914	Greves, E. Hyla, M.D., F.R.C.P.	Rodney House, 19 Poole Road
1914	Greves, S. S. Hyla	,, ,,
1917	Grindley, Miss E. J.	Milnthorpe, Rossmore Avenue, Parkstone

H

1923	Haigh, A. E.	Exhall, 20 Christchurch Road
1924	Hall, L. Beeching, F.L.S.	Lingdene, King's Avenue, Parkstone
1921	Hardwick, S.	51 Poole Hill
1913	Harris, Miss K.	Trescott Grange, Harvey Road, Boscombe
1927	Harrison, Mrs. E. E.	Martello Firs, Canford Cliffs
1912	Harrison, Henry	Eden Lodge, 7 Surrey Road South
1927	Harrison, Miss J. D.	13 Beresford Road
1926	Harrison, Miss M. P.	Hinton Vicarage, Christchurch
1914	Hartley, Dr. J.	62 Portchester Road
1914	Hartley, Mrs.	,, ,,
1922	Hartley, J. A.	,, ,,
1927	Hartree, D. G.	197 Holdenhurst Road
1927	Hartree, Miss B. M.	,, ,,
1921	Hassell, Miss A. C.	Avonwood, 20 Owls Road, Boscombe
1914	Hatton, Rev. C. O. S., B.A., F.L.S.	Hinton Vicarage, Christchurch
1921	*Elected an Honorary Member	
1920	Hawes, Miss	The Moorings, 27 Nelson Road
1924	Hawley, Miss H. M.	Galloway Lodge, 27 Florence Road, Boscombe
1917	Haydon, C. J.	Ben Veula, 29 West Cliff Road
1923	Hayman, W. S., M.B.	Thorncliffe, Queen's Park South Drive
1923	Hayman, Mrs.	,, ,, ,, ,,
1923	Hayman, R. L.	,, ,, ,, ,,
1923	Hayman, Miss M. S.	,, ,, ,, ,,
1918	Haythorne, E. C. C.	Forest Lodge, Burton Road, Branksome Park
1927	Head, Mrs.	Stoberry, Parkstone
1925	Heal, H.	16 Holdenhurst Road

1921	Hellyar, Miss E. F.	Cerne Abbas, 1 Belvedere Road
1921	Hellyar, Miss M. F.	" "
1923	Hellyar, Miss M. R.	" "
1917	Henderson, Miss A. J.	Springbank, 22 Fox Road, Greenock
1921	Heymann, B. M.	Greencroft, Alyth Road, Talbot Woods
1921	Heymann, Mrs.	" " "
1923	Hill, C. S.	Northfield, Chigwell Road
1904	Hinton, Miss	Welcombe, Wilfred Road, Boscombe
1924	Hoare, Miss E.	7 Cambridge Road
1922	Holdom, Mrs. E.	Cranfield, Mansfield Road, Parkstone
1909	Holmes, Mrs.	Brackenwood, 37 Southern Road, West Southbourne
1911	Holmes, Miss S. C. M.	4 Beaufort Road, West Southbourne
1911	Homer, L. V. C.	Carron, 54 Southcote Road
1927	Horne, H. C.	Southcliffe Hotel, West Cliff
1927	Horne, Mrs.	" "
1920	Horne, Miss J.	Ayton House, West Cliff Road
1924	Howell, W. Rees	Cintra, 35a Richmond Wood Road
1923	Howell, Mrs. Rees	" " "
1911	Hudson, F.	Penarol, Parkstone
1911	Hudson, Mrs.	" "
1925	Humby, H. G.	Brackendene, 23 Wimborne Road
1925	Humby, Mrs.	"
1927	Hunt, Mrs. F.	33 Stirling Road
1926	Hurry, J. B., M.A., M.D., J.P.	Heathlands, East Cliff
1926	Hurry, Mrs. G. L.	" " "
1926	Hurry, A. G, M.A.	" " "
1927	Hutchinson, Col. C. A. R., D.S.O.	Windermere, Canford Cliffs
1927	Hutchinson, Mrs.	" "

I

1905	Ibbett, F. W., M.A.	Town Hall
1920	*Elected an Honorary Member	
1926	Innes, A. A.	Old Pines, Ferndown
1925	Insch, J. M.	16 Colville Road, Boscombe
1925	Insch, Mrs.	" "
1923	Isaacs, G. H., B.A.	Hillsley, Caledon Road, Parkstone

J

1921	Jackson, Mrs. Gidlow	64 Portchester Road
1926	Jackson, Mrs. C. M.	The Dakota, Beaulieu Road, Alum Chine
1912	James, T. B.	Trevenen, Howard Road
1912	James, Mrs.	" "
1920	James, S.	" "
1927	Jameson, W. G.	43 Wentworth Avenue, W. Southbourne
1923	Jenkins, Miss B. M.	7 Talbot Avenue
1927	Jennings, Col. E., I.M.S.	South Cliff Hotel, Southbourne
1925	Jones, Miss A. R.	Abbotsfield, 1 Leicester Road, Branksome Park
1922	Jones, J. Williamson	Tyndal Lodge, Forest Road, Branksome Park
1908	AJones, W.	3 Granville Road, Boscombe
1905	Jones, W.	254 Old Christchurch Road

K

1910	Kay, A. J.	Valliscourt, 100 Lowther Road
1923	Kenrick, Miss M.	8 St. Luke's Road

1927	Kilburn, Miss Alice M.	9 Glenmoor Road, Winton
1927	Kilburn, Miss Annie	,, ,,
1919	Kilner, John	St. Mary's, Chessel Avenue
1916	Kilner, Miss E. M.	,, ,,
1919	Kilner, Miss R. M.	,, ,,
1919	Kilner, Miss S.	,, ,,
1920	Kitching, Mrs.	Fernworthy, Brunstead Road
1927	Knight, Miss E. M.	Hereford House, Hinton Road

L

1919	Lacey, Howard, B.A.	50 Wellington Road
1919	La Touche, Miss	Oakfield, Danecourt Road, Parkstone
1926	Laughlin, Col. Charles	Carbery Wood, Tuckton Road, Southbourne
1922	Lawrence, S. C., M.B., Ch.B.	106 Richmond Park Road
1923	Lawrence, Mrs.	,, ,,
1918	Lee, E. Kenworthy	Rosebank, 39 Lansdowne Road
1919	Leech, Miss M. E.	Castle Bar, 32 Crabton Close Road, Boscombe
1919	Leech, Miss M. M.	,, ,, ,, ,,
1924	Legg, Mrs. A. E.	4 Hinton Road
1910	Lendrum, Miss A. M.	San Remo, 13 Carysfort Road
1903	**G** o*Linton, Rev. E. F., M.A., F.L.S.	Offwell, 14 St. Catherine's Road, Southbourne
1925	Little, J. T., M.A.	Yed Hill, Ringwood
1925	Little, Mrs.	,, ,,
1925	Little, Miss C. J.	,, ,,
1925	Little, Miss S. P., M.A.	,, ,,
1922	Littleboy, Miss E. S.	2 Bodorgan Manor, 12 Bodorgan Road
1923	Littlewood, Engineer Capt. A. W., R.N., retd., O.B.E., Chevalier Legion of Honour	28 Princess Road
1922	Logan, T. T.	10 Argyll Road, Boscombe
1916	Logan, Mrs.	,, ,,
1922	Logan, Miss G. M.	,, ,,
1922	Logan, Miss S. M.	,, ,,
1924	Longbottom, F. W., F.R.A.S.	Haslemere, Penrith Road, Boscombe
1922	Longstaff, Mrs. T. G.	Picket Hill, Ringwood
1920	aLove, W. J. E.	St. Clement's School House
1903	oLupton, Miss	Bolingbroke, Knole Road
1909	Lyon, Claude	Shalimar, Wilderton Road, Branksome Park
1910	Lyon, Mrs.	,, ,, ,,

M

1925	Macdonald, Lady	70 Wellington Road
1927	MacLachlan, Andrew, M.D.	The Haven, Lansdowne Road
1908	aMackay, Miss	8 King's Park Road
1911	McBean, Miss J.	Inglenook, 29 Parkwood Road
1909	McBean, Miss S.	St. Michael's, Buxton
1920	Male, H. C., M.D., M.R.C.S.	35 Irving Road, West Southbourne
1925	Male, Miss G. E.	,, ,, ,,
1922	Mangin, S. H.	Burton, Christchurch
1922	Marsden-Jones, E. M.	The Church House, Potterne, Devizes
1922	Marsden-Jones, Mrs.	,, ,, ,,
1917	Marston, Miss G.	Bourne Hall Hotel
1913	Martin, Miss F. G.	32 Southbourne Road
1925	Mason, Mrs. F.	The Anchorage, Hathaway Road, Southbourne

1921	Massingberd, A. K.	17 West Cliff Road
1921	Massingberd, Miss A. A.	,, ,,
1914	Mate, S. J.	10 Landseer Road
1921	Mate, Mrs.	,, ,,
1918	Matthews, Mrs. J. P.	The Bungalow, Lascelles Road, Boscombe
1925	Matthews, Miss M. J.	Netherbury, Cecil Road, Boscombe
1925	Mattocks, T.	Meyrick Cliffs Hotel, Beacon Road
1921	Mattocks, Mrs.	,, ,, ,,
1925	Mattocks, C. G. B.	,, ,, ,,
1922	Mattocks, T. E. T.	,, ,, ,,
1926	Mears, Miss J. A.	27 St. Alban's Crescent
1926	Miles, Mrs. F. A.	Milestone, 16 Meyrick Park Crescent
1925	Miller, Miss B.	Sunnycroft, Penrith Road, Boscombe
1926	Miller, Miss W. E.	,, ,, ,,
1927	Mitchell, Miss F. H.	Moor House, Ferndown
1922	Moore, Major T. C., I.M.S.	Verwood, Dorset
1919	Moorhead, Mrs.	Brightlands, 34 Crabton Close Road
1908	†*Morris, Sir Daniel, K.C.M.G., J.P., M.A., D.SC., D.C.L., LL.D., F.L.S.	14 Crabton Close Road
1911	Morris, Lady	,, ,,
1925	Morris, Miss E. M.	Woodford, Glengariff Road, Parkstone
1926	Morton, Hamilton, M.A., M.D.	Court Lodge, Branksome Park
1908	Moss, Miss	The Grange, 52 Westby Road
1927	Mott, Miss A.	4 Dingle Road
1924	Moulson, Miss R.	20 St. Stephen's Road
1925	Murray, C. H.	Hallowdene, Belle Vue Road, Parkstone

N

1919	Nankivell, B. W., M.R.C.S., L.R.C.P.	Woodstock, 2 West Cliff Road
1912	Neave, Miss	Lingdale, 73 Lansdowne Road
1927	Newcome, Mrs. R. F.	25 Queen's Park South Drive
1925	Newman, Mrs. C. A.	Harewood, 17 Dean Park Road
1926	Nicholson, A. J.	Maryland, Leicester Road, Branksome Park
1921	Ninnes, G. I.	St Ives, Watcombe Road, West Southbourne

O

1920	Oaten, Mrs.	19 Sunnyhill Road, W. Southbourne
1922	AOdell, Miss M. E., B.SC.	44 Compayne Gardens, London, N.W. 6
1910	Oke, A. W., B.A., LL.M., F.G.S., F.S.A.	32 Denmark Villas, Hove, Brighton
1927	Oldham, H.	Holmesdale, Browning Avenue
1924	Ormrod, T. B.	20 Knole Road
1920	Osborne, J. H.	Woodside, Kinson
1922	Ousby-Trew, Rev. C., M.A.	Overthorpe, 19 Florence Road, Boscombe
1922	Ousby-Trew, Mrs.	,, ,, ,, ,,
1922	Ousby-Trew, Miss	,, ,, ,, ,,

P

1904	Painter, Mrs.	29 Talbot Road
1919	Parker, Miss M.	The Cliff, 13 Southwood Avenue, W. Southbourne
1926	Parrott, F. W.	33 Heathwood Road

1926	Parton, Miss E. C.	197 Holdenhurst Road
1926	Parton, Miss M. A.	,, ,,
1927	Paterson, Mrs. E. B.	The Grove, Grove Road
1926	Paterson, Miss L.	Corfe Lodge, Parkstone
1926	Paterson, Miss M.	,, ,,
1926	Paterson, Miss N.	,, ,,
1924	Pattinson, Dr. T. W	59 Wellington Road
1924	Pattinson, Mrs.	,, ,,
1925	Peach, Miss M. E.	12 Bryanston Road
1924	Pells, J.	9 Stokewood Road
1913	†Penrose, F. G., M.D., F.R.C.P., F.Z.S., M.B.O.U.	Woodbury, 9 Grove Road, East Cliff
1916	Penrose, Mrs.	,, ,, ,,
1916	Penrose, Miss F.	,, ,, ,,
1916	Penrose, Miss M.	,, ,, ,,
1912	Pestell, Miss	Engelberg, 92 Surrey Road
1911	Phillips, Mrs.	21 McKinley Road
1921	Phillips, Rev. C. A.	36 Dean Park Road
1921	Phillips, Miss C. E.	,, ,, ,,
1925	Pigeon, H. W., M.A., M.B., B.Ch., F.R.C.S.	Ebor Lodge, Church Road, Canford Cliffs
1926	Pigeon, Mrs.	,, ,, ,,
1926	Pigeon, Miss K. M.	,, ,, ,,
1926	Pigeon, Miss N. J.	,, ,, ,,
1920	Pilkington, Mrs. K. C. S.	The Steyne, 9 Manor Road
1920	Pilkington, Miss K. D.	,, ,,
1920	Pilkington, Miss L. D.	,, ,,
1927	APocock, Miss E.	22 Beechwood Avenue, Boscombe
1927	Pollen, G. A. J.	San Remo, Durley Road
1921	Pontifex, R. D.	Dalton House, 68 Christchurch Road
1920	Pontifex, Mrs.	,, ,, ,,
1921	Pontifex, G. K. D.	,, ,, ,,
1926	Potter, Rev. Prof. M. C., M.A., D.SC., F.L.S.	Corley Croft, York Avenue, New Milton
1926	Power, Lady	Newlands Manor, Lymington
1925	Price, L	Oakwood, Harvey Road, Boscombe
1925	Price, Mrs.	,, ,, ,,
1925	Price, Miss H. B. K.	,, ,, ,,
1918	Punch, Cyril	60 Wellington Road

Q

1922	Quick, R., F.S.A. (Scot.)	Russell-Cotes Art Gallery and Museum
1924	Quick, Mrs.	,, ,, ,, ,,

R

1927	Raine, A. D.	Milverton, Lymington
1927	Raine, Mrs.	,, ,,
1912	Rankin, W. Munn, M.SC. (Leeds), B.SC. (Lond.)	Municipal College, Burnley, Lancs.
1920	*Elected an Honorary Member	
1927	Rankin, Mrs.	52 Fitzharris Avenue
1917	Ranshaw, Miss E. M.	9 Warren Road
1918	Ratcliffe, Mrs.	Brooklands, 32 Branksome Wood Road
1926	Rayner, Miss E.	The Homestead, 29 St. John's Road, Boscombe
1919	Rayner, Miss F.	,, ,, ,,
1905	*Rayner, J. F., F.R.H.S., M.B. MYC. S.	Swaythling, Southampton

1922	Rebbeck, Sub.-Lt. L. E.	Stafford Lodge, 26 Dean Park Road
1922	Rebbeck, Major T. V.	Chota Koti, 7 Stoke Wood Road
1923	Reeves, Miss S., M.B.E.	St. Cross, 13 Bodorgan Road
1924	*Reid, Mrs. E. M., B.SC., F.L.S.	Pinewood, Milford-on-Sea
1919	Richards, Miss E. E., B.SC.	West Cliff Towers, 12 Priory Road
1927	Richey, H. A., B.A.	1 Brookside, Exeter Lane
1927	Richey, Mrs.	,, ,,
1926	Rix, Miss M. E. de B.	Wayside, Stourcliffe Avenue
1916	Roberts, H. Astley, B.A.	Shalvah, Wilfred Road, Boscombe
1918	Roberts, Mrs.	,, ,, ,,
1924	Roberts, Mrs. J.	Aysgarth, 16 Poole Road
1924	Roberts, Mrs. W. F. M.	19 Florence Road, Boscombe
1924	Robertson, W. G. A., M.D., F.R.C.P., F.R.S. Edin., F.S.A.S.	St. Margaret's, Keswick Road, Boscombe
1921	Robins, Miss E.	11 Richmond Wood Road
1927	Robins, F. W., F.R.G.S.	4 Harewood Avenue, West Southbourne
1923	Roden, Miss E. M.	14 Campbell Road, Boscombe
1920	Rogers, Miss C. M.	4 Hengist Road
1905	Rogers-Barns, Miss	Vergers Mead, Corfe Castle
1914	Rooke, Miss S. G.	Norbury, 53 Paisley Road
1914	*Roper, Miss Ida M., F.L.S.	4 Woodfield Road, Redland, Bristol
1922	Rosling, A. W.	85 Wimborne Road
1922	Rosling, Mrs.	,, ,,
1922	Rosling, Miss D. M.	,, ,,
1916	Rothwell, Mrs.	21 Wentworth Avenue, West Southbourne
1925	Ruddle, Mrs. F. J.	12 Richmond Park Crescent
1913	Russell-Cotes, H. V. M.	3 Meyrick Park Crescent

S

1926	Sale, G.	Fixby, Milner Road
1926	Sale, Miss L.	,, ,,
1926	Sale, Miss M.	,, ,,
1926	Sale, V. M.	,, ,,
1925	Saunders, E. W.	Deep Dale, 41 Surrey Road
1925	Saunders, Mrs.	,, ,,
1919	Savage, J. W.	41 Wentworth Avenue, W. Southbourne
1927	Sayle, G. M.	Malvernbury, Watcombe Road
1912	Scarlett, Miss A.	Fernroy, 4 St. Alban's Avenue
1914	Scholes, Denton	The Holme, 16 Cambridge Road
1915	Scholes, Mrs.	,, ,,
1922	Scholes, R. D.	,, ,,
1922	Scholes, Miss V. O. M. D.	,, ,,
1926	Scollick, Mrs.	Brundon, 2 Surrey Road
1919	Scott, G. B., C.I.E.	Glencoy, 80 Surrey Road
1904	Scott, J. H., M.E., M.I.M.C.E.	Kirkby, 22 Linwood Road
1926	Scott, Miss A.	Rockmount, St. Michael's Road
1926	Scott, Miss E.	,, ,,
1926	Scott, Miss F.	,, ,,
1916	ASeeviour, G. C., A.C.P., F.R.H.S.	St. Peter's School House
1926	Seymour, Mrs. A. J.	Brownswood Hall Hotel, South Cliff
1926	Shann, W. A., M.B.	31 Hamilton Road, Boscombe
1914	Sharp, C.	Langdon, Parkstone
1919	Sharp, Miss E.	,, ,,
1919	Sharp, Miss F.	,, ,,
1927	Sherrard, Miss L. J.	Royal Bath Hotel
1923	Sherrin, T. M., M.A.	5 Landseer Road
1903	GoSherring, R. Vowell, F.L.S.	Hallatrow, near Bristol
1907	Sherring, Miss O. L.	,, ,,
1926	Shipman, Lt.-Col. H. J.	28 Surrey Road

1916	Simpson, Rev. E. J. Douglas, M.A.	Maesbury, 3 Cavendish Road
1920	Simpson, N. Douglas, B.A., F.R.M.S., F.L.S.	,, ,,
1927	Sitwell, H. W. W.	Glenconnor, Ferndown
1927	Sitwell, Miss M. R.	,, ,,
1924	Smith, Miss E. E.	7 St. John's Road, Boscombe
1925	Smith, H. H.	9 Cambridge Road
1926	Smith, Mrs.	,, ,,
1918	Smith, Horace, M.A., M.D.	Sunnyhurst, 7 Dean Park Road
1918	Smith, Miss M. A.	Woodside, St. Alban's Crescent
1914	Smyth, W. Johnson, M.D.	Pirbright, West Cliff Gardens
1922	Smyth, Mrs.	,, ,,
1922	Smyth, Miss M.	,, ,,
1912	Smythe, J. H. Ralph, J.P.	Willstead, 22 Cavendish Road
1915	Smythe, Mrs.	,, ,,
1920	Smythe, Miss D.	,, ,,
1916	Smythe, Miss K. M.	,, ,,
1919	Snell, Dr. S. H.	1 Portman Crescent
1919	Snell, Mrs.	,, ,,
1919	Snell, Miss M.	,, ,,
1924	Snell, Miss W.	,, ,,
1921	Sowton, Miss E. M.	57 Southbourne Road, W. Southbourne
1922	Speakman, Mrs. E.	13 Milton Road
1909	Spencer, J. F.	Glenthorne, 73 Richmond Park Road
1917	ASpry, Miss A. G., LL.A.	12 Sunnyhill Road, W. Southbourne
1923	Stables, A. D.	Saxthorpe, St. Osmund's Road, Parkstone
1923	Stables, Mrs.	,, ,, ,, ,,
1926	Standring, J.	Naseby Nye, Byron Road, Boscombe
1926	Standring, Mrs.	,, ,, ,,
1923	Starr, Col. W. H., C.B., C.M.G., C.B.E.	Nikko, Foxholes Road, Southbourne
1926	Steeple, H. H.	26 Heatherlea Road, Southbourne
1926	Steeple, Mrs.	,, ,, ,, ,,
1921	Stevens, C. S.	Goodwin, Howard Road
1916	Stiff, S. J., B.SC.	Norden House, Corfe Castle
1916	Stiff, Mrs.	,, ,,
1916	Stiff, Miss M. J.	,, ,,
1920	Stoney, Miss F. A., O.B.E., M.D., B.S.	Ardvoulan, 29 Poole Road
1924	Story, F. N.	Storyland, Church Road, Southbourne
1924	Story, Mrs.	,, ,, ,, ,,
1925	Strachan, Lt.-Col. E. A.	Moorfield, 1 Bodorgan Road
1918	G *Sumner, Heywood, F.S.A.	Cuckoo Hill, South Gorley, Fordingbridge
1926	Sutton, W. R.	Bodowen, Strouden Road East
1926	Sutton, Mrs.	,, ,, ,,
1911	Swain, H. E.	Sorrento, Studland Road
1922	*Elected an Honorary Member	
1906	Swallow, E.	York Cottage, Ravine Road, Canford Cliffs
1922	ASymes, H., M.A.	52 Lowther Road

T

1927	Tanner, Mrs. Slingsby	2 Cavendish Place
1911	Tatchell, Leonard, F.E.S.	Swanage, Dorset
1915	Taylor, F. B., B.A.	Claregarth, Montague Road, W. Southbourne
1916	Taylor, Mrs.	,, ,, ,, ,,
1916	Taylor, Miss M. A.	,, ,, ,, ,,
1916	Taylor, Miss M. W.	,, ,, ,, ,,

1926	Taylor, Miss H.	Knole Hall, Knyveton Road
1923	Thill, J. A.	8 Colville Road, Boscombe
1923	Thill, Mrs.	,, ,,
1925	AThomasson, Miss M. E.	37 Belvedere Road
1924	Thompson, J. H.	14 Chestnut Avenue, W. Southbourne
1924	Thompson, Mrs.	,, ,, ,, ,,
1927	Thompson, E. H.	Ardmore, Langdon Road, Parkstone
1922	Thomson, A. W. Ferguson	Ailsa, Erpingham Road
1911	Thomson, Mrs. Roberts	Monkchester, 17 Manor Road
1919	Thoroton, Rev. E. W.	Hill House, Spencer Road, Canford Cliffs
1911	Tickell, Miss S. M.	Pinewood, 56 Stourcliffe Avenue, W. Southbourne
1911	Turner, J. E.	Bramley, 94 Surrey Road
1914	Twemlow, Miss E. E.	Devon Lodge, 83 Alumhurst Road

V

1913	Veale, Miss A. G.	2 Richmond Park Crescent
1923	Veale, Miss B.	,, ,,
1923	Veale, Miss C. M.	,, ,,
1923	Veale, Miss L. H.	,, ,,
1908	Vernon, Lieut.-Col., A. H., L.R.C.P., F.R.C.S.	1 Carnarvon Crescent, Boscombe
1918	AVorse, John	Leighurst, Walkford, Christchurch

W

1903	Go†Waddington, H. J.	Moreton, 107 Lowther Road
1918	*Elected an Honorary Member	
1924	AWadlow, H. J.	The Gables, Queen's Grove, Parkstone
1916	Walby, A. E.	Netherton, 2 Dean Park Road
1921	Wales, Miss	The Nook, 4 Ormonde Road, Branksome Park
1921	Wales, Miss N.	,, ,, ,, ,,
1918	Walker, R. S.	Meyrick Cliffs Hotel
1913	Wallace, W. G.	Doveshill Cottage, Ensbury Park
1912	Walter, Mrs. G. P.	Rusholme, 10 St. Anthony's Road
1923	Walter, T. James	101 Lowther Road
1920	Wanstall, W. S.	Del Monte, 5 Roslin Road
1920	Wanstall, Mrs.	,, ,,
1927	Ward, H. P.	Braemar, Egerton Road
1927	Ward, Mrs.	,, ,,
1905	Waters, A. W., F.L.S., F.G.S.	Alderley, 2 McKinley Road
1906	Waters, Mrs.	,, ,,
1923	Watts, W. H.	4 Stourwood Avenue, W. Southbourne
1927	Watts, Mrs.	,, ,,
1920	Wells, Rev. E., M.A.	Glen Roy, 22 Studland Road
1924	West, Miss M. G.	Larnaca, 23 Argyll Road, Boscombe
1913	Wetherell, Miss M.	Triana, 21 Harvey Road, Boscombe
1920	Wetherell, Miss S.	,, ,, ,, ,,
1918	Whitaker, S.	22 Somerset Road, Boscombe
1924	Whitaker, S. E., M.S.A.	22 Selwood Road, Addiscombe, Croydon
1924	Whitaker, Miss E. M.	The Lawn School, Clevedon
1920	White, J. R., M.A.	Whitecot, 15 Linwood Road
1920	White, Mrs.	,, ,,
1921	White, Mrs. E. Sinclair	35 East Avenue
1916	Whyte, A. C.	Byberry, 5 Roslin Road
1916	Whyte, Mrs.	,, ,,
1916	Whyte, Miss M. C.	,, ,,
1916	Whyte, Miss M. N.	,, ,,

1919	Williams, John	Brynmill, 68 Southcote Road
1926	Williamson, H. J.	Quiddington, Birchwood Road, Parkstone
1924	AWillis, Miss G. H.	116 Paisley Road, West Southbourne
1927	Wilmot, O. H.	Bryanstone, Woodside Road, West Moors
1920	Woodhouse, Rev. A. P.	Deanhurst, 5 Littledown Road
1905	Woodhouse, W. J., A.C.P., M.I.H.	35 Chatsworth Road, Malmesbury Park
1918	Woodhouse, Mrs.	,, ,, ,, ,,
1923	Woodhouse, W. R.	,, ,, ,, ,,
1923	Woodhouse, Miss M. M.	,, ,, ,, ,,
1927	Wotherspoon, Miss	Rockmount, St. Michael's Road

Y

1924	Yates, Rev. A. G., M.A., R.N.	14 Wellington Road
1924	Yates, Mrs.	,, ,,
1924	Yates, Miss E. M. M.	,, ,,
1927	Yeldham, Miss D.	Stanleys, New Milton
1917	AYoung, Miss A.	6 Salisbury Road, Boscombe

RULES OF THE
Bournemouth Natural Science Society.

Title

1.—The title of the Society shall be THE BOURNEMOUTH NATURAL SCIENCE SOCIETY.

Objects

2.—The objects of the Society shall be:

(*a*) The promotion of the study of Science in all its branches, by means of Lectures, Field Meetings, the Reading and Discussion of Papers, the formation of Sections of its members devoted to any particular branch of the Society's work, and in any way that the Council of the Society shall deem advisable.

(*b*) The making of reports on any animal, plant, or object of interest, and the carrying out of the recommendations contained in such reports.

Members

3.—The Society shall consist of Ordinary, Life, Honorary and Associate Members.

Ordinary Members

4.—Ordinary Members shall pay an Annual Subscription of One Pound, due on the first day of October in each Year. The inclusive Annual Subscription for Adult Members of the same family, not exceeding four and residing in the same house, shall be Two Pounds, each Member being elected in the usual manner and each receiving a card of membership. Persons living outside a radius of six miles from the Square at Bournemouth may be elected Country Members, and pay one half the above rates of subscription.

Life Members

5.—The Subscription for Life Members shall be Ten Pounds. Any Ordinary Member who shall have commuted his Subscription, as provided for in this Rule, shall become a Life Member, but shall not by reason thereof have any rights differing from those of an Ordinary Member.

¶ Rules 5a and 5b referred to in the Trust Deed are Rules 19 and 20.

Honorary Members

6.—Any person distinguished in Science or who has rendered any special service to the Society, may be elected an Honorary Member. Honorary Members shall be proposed and elected in the same way as Ordinary Members. The number of Honorary Members shall be limited to twenty.

Associate Members

7.—Persons may be admitted Associate Members by the Council on account of their scientific attainments or because they are likely to prove useful working Members of the Society. This privilege will usually be granted to School Teachers.

The annual subscription for Associate Members shall be seven shillings and sixpence. They shall be entitled to all the privileges of Membership except that they shall have no power of voting on the affairs of the Society or of holding office.

Proposal and Election of Members

8.—The Ordinary, Life, and Associate Members of the Society shall be proposed by a Member to whom they are known personally or to whom they have presented adequate credentials, and seconded by another Member, and the proposal, in the form following these Rules, shall be sent to the Honorary Secretary. The name of any such proposed new Member shall be posted on the Notice Board of the Society for a period of not less than seven days, after which such name shall be voted upon at the next ensuing Council Meeting, and if two-thirds of the Council present and voting shall vote for the proposed New Member, such Candidate shall become a Member upon payment of the Annual Subscription and shall receive a Card of Membership which is not transferable. Any Member joining during August or September shall receive a Card of Membership to September 30th of the following year without further payment.

Unpaid Subscriptions

9.—Any Members whose subscriptions are unpaid at the end of the financial year (September 30th), after notice in writing to that effect has been given to them by the Honorary Treasurer, shall be reported to the Council, which shall have the power of removing their names from the list of members.

Resignations

10.—Resignations must be in writing and addressed to the Honorary Secretary. Members are liable for all subscriptions which may have fallen due prior to the date of resignation.

Executive Officers.

11.—The Executive Officers of the Society shall be the Chairman of Council, the Deputy Chairman of Council, Honorary Treasurer, and Honorary Secretary.

The President

12.—The President shall be elected annually and need not necessarily be selected from Members of the Society. He shall be invited to deliver an Address at as early a date in the Winter Session as can be arranged.

Vice-Presidents

13.—Any Member of the Society who, in the opinion of the Council, has rendered distinguished service to Science or to the Society, shall be eligible for election as a Vice-President at the Annual Meeting and, if elected, shall retain office as long as he remains a Member of the Society.

Chairman of General Meetings

14.—The President or a Vice-President shall take the Chair at all General Meetings other than the Annual and Special Meetings. At these the Chairman of Council or Deputy Chairman shall preside.

Honorary Secretary

15.—The Honorary Secretary shall perform all the usual secretarial work, shall keep minutes of all Council Meetings, and of the Annual and Special Meetings, and make a synopsis of all other General Meetings. He shall cause the agenda of the Annual and Special Meetings to be sent to every Member seven days at least before each such Meeting. He shall make all preparations for General Meetings and General Excursions, in respect of which he shall collect from each Member his share of the expenses, and therefrom defray all costs of the Meetings or Excursions. Any surplus of such collections shall go to the General Fund, and any deficit be defrayed out of that Fund. He shall keep an account of all out-of-pocket expenses. He shall give notice of their election to all new members, and register the Sections, if any, to which they ask to belong. He shall furnish copies of the Annual Reports published during their membership, to all Members who have paid their subscriptions, the number of copies of the "Proceedings" supplied in respect of each family subscription shall not exceed two; to Honorary Members, and to such Scientific Societies as the Council may from time to time appoint to receive them.

Honorary Treasurer

16.—The Honorary Treasurer shall have the custody of the General Funds of the Society. He shall receive and acknowledge all Subscriptions, and shall issue tickets of Membership to all persons who are duly elected and have paid their Subscriptions. He shall bring before the Council any accounts that are due for payment. He shall prepare a financial Statement at the end of each Financial Year to be presented to the Council at the Meeting next preceding the Annual Meeting. After presentation of the Financial Statement to the Council, he shall submit it to the Auditors and lastly to the Annual Meeting of the Society.

Council

17.—There shall be a Council of the Society consisting of the Vice-Presidents who have filled the office of President, the Honorary Treasurer, the Honorary Secretary, the Honorary Librarian, the Honorary Editor, the Honorary Curator, the Chairmen of Sections, not more than ten Members elected by the Society and not more than two co-opted Members.

18 (*a*).—The Council shall have the general management of the Society and the control of its funds. At all Meetings of the Council, five shall form a quorum. The Council shall elect its own Chair-

man and Deputy Chairman for the Year, shall have power to fill up vacancies in its number, and to co-opt not more than two additional members. The Council shall have power to appoint Committees to deal with any business that may be delegated to them.

(*b*) The Chairman, or in his absence the Deputy Chairman, shall have an original and a casting vote at all Meetings of the Council.

(*c*) The Council shall arrange all Lectures, Papers, Demonstrations and Exhibitions of Specimens, etc., for the General Meetings and Excursions of the Society, and shall approve of all arrangements for Sectional Meetings and Excursions before they are included in the monthly programme.

(*d*) If any elected or co-opted member of the Council shall fail to attend four consecutive Meetings of the Council, his seat shall become vacant unless the Council shall decide otherwise.

Trustees

19.—The property of the Society shall be vested in Trustees who shall be elected by the Council. The number of Trustees shall be not more than nine or less than three, and they shall respectively hold office until death or resignation, unless removed from office by a resolution of the Council. The Trustees shall from time to time deal with the property of the Society as directed by resolution of the Council (of which an entry in the minute book shall be conclusive evidence), and they shall be indemnified against all liability whatsoever out of the property for the time being of the Society.

¶ This Rule is referred to in the Trust Deed as Rule 5a.

Borrowing Power

20.—If at any time the Society in general meeting shall pass a resolution authorising the Council to borrow money, the Council shall thereupon be empowered to borrow for the purposes of the Society such amount of money, either at one time or from time to time, and at such rate of interest, and in such form and manner, and upon such security as shall be specified in such resolution, and thereupon the Trustees shall make all such dispositions of the property of the Society or any part thereof, and enter into such agreements or arrangements in relation thereto, as the Council may by resolution direct for giving security for such loan or loans and interest thereon at the agreed rate. All members of the Society, whether voting on such resolution or not, and all persons becoming members of the Society after the passing of such resolution shall be deemed to have assented to the same as if they had voted in favour of such resolution.

¶ This Rule is referred to in the Trust Deed as Rule 5b.

Visitors

21 (*a*).—A Member may introduce friends who accompany him to all parts of the Society's premises except those which are let or in use for a Lecture or Meeting. The Member must enter the names and addresses of such Visitors in the Visitors' Book and sign the entry. Strangers cannot be admitted on presenting a Member's card or letter.

(*b*) A Member may introduce two Non-Members, who accompany him, to any Lecture or Excursion of the Society, but no Non-Member may be thus introduced to more than two Lectures in the Winter Session and two Excursions in the Summer Session, even though introduced by different Members. In the case of Lectures, the introducing Member must enter the names and addresses of the Visitors in the Visitors' Book and sign the entry. In the case of Excursions, the introducing Member must send the names and addresses to the Organiser of the Excursion.

(*c*) A Member introducing a Visitor is responsible for ascertaining that the Visitor has not been introduced twice previously in that Session and also that the privilege is not used for commercial purposes.

(*d*) A Visitor to Bournemouth may, with the approval of the Council, be granted a ticket enabling him to attend the Meetings and Excursions of the Society for a period not exceeding six months at a charge of Fifteen Shillings.

(*e*) The Council shall have power to extend the hospitality of the Society to distinguished Visitors.

(*f*) The Council shall have power temporarily to alter or suspend this Rule or any part of it.

Charges for Meetings

22.—The Council shall have power to make a charge to Members for admission to any Meeting the holding of which involves special expenses, and may arrange for the admission of Non-Members.

Expulsion

23.—The power of expulsion of a Member from the Society for objectionable conduct shall be vested in the Council and exercised at a Special Meeting called for that purpose. Notice of the proposed expulsion must be given on the circular convening the Meeting. The expulsion must be carried by a majority of two-thirds of those present.

The Member affected shall have power to appeal to a General Meeting of the Society to act by the like majority.

The Annual and Special Meetings

24 (*a*).—The Annual Meeting shall be held in the month of October.

(*b*) At this Meeting the President, the Chairmen of Sections, the Honorary Treasurer, the Honorary Secretary, the Honorary Librarian, the Honorary Editor, the Honorary Curator, not more than ten Members of the Council and two Auditors for the ensuing year shall be elected, either Auditor having the power to audit the accounts in the absence of the other.

(*c*) At this Meeting the Council's Report for the past year, and the Honorary Treasurer's statement of accounts duly signed by the Auditors, shall be submitted.

(*d*) Notice convening an Annual or Special Meeting, together with the agenda and details of any proposed alterations in the Rules, shall be given to Members at least seven clear days before such Meeting is held. Notice of General Meetings shall be given at least seven clear days beforehand.

(*e*) On a written Requisition, signed by at least ten Members of the Society, the Council shall call a Special Meeting to consider any question as to the affairs of the Society, such Meeting to be called within three weeks of the Council Meeting next following the receipt by the Honorary Secretary of the Requisition, and at least seven clear days' Notice shall be given to the Members. At such Meeting no other business than that mentioned on the Requisition, and on the notice convening such Meeting, shall be considered.

(*f*) At the Annual Meeting and at all Special Meetings of the Society, not less than twenty-five Members shall form a quorum.

Section

25 (*a*).—The Council shall have power to form a Section for the study of any special subject deemed within the scope of the Society's work, and shall appoint the Chairman for the first year.

(*b*) The Chairman of each Section shall appoint a Secretary for the Section, who, in addition to the ordinary secretarial duties, shall keep a list of the Members of the Section.

(*c*) A Section shall consist of those Members who have signified to the Honorary Secretary or the Secretary of the Section their wish to belong to that Section.

(*d*) The Members of each existing Section shall, at a Meeting held before the last week in July in each year, nominate the Chairman of the Section for the ensuing year to come into office after the Annual Meeting. The Secretary of the Section shall send such Nomination to the Honorary Secretary in time to present it at the Council Meeting held on the last Monday in July.

(*e*) If the Council approve of the Nomination, it shall recommend the person nominated for Election at the Annual Meeting, otherwise it shall refer the matter back to the Section. In the event of a Section failing to nominate a Chairman, the Council shall have the right to do so. The final Election shall take place at the Annual Meeting.

(*f*) At the request of the Sectional Chairman the Secretary of a Section may attend Meetings of the Council, but without the power of voting.

(*g*) Each Sectional Chairman shall be responsible for the preparation and arrangement of each Sectional Meeting and Excursion, and shall furnish details of the same to the Honorary Secretary for submission to the Council. At the end of each Session he shall render to the Honorary Treasurer an account of his receipts and payments for the Section.

(*h*) A Minute Book for each Section shall be kept in which shall be entered details of the Section's work and an account of all Sectional Meetings, with the number of Members attending and notes on any matters of interest observed or discussed. Such book shall be submitted to the Council whenever required. The Chairman of each Section shall send to the Honorary Secretary a report of the Section's work for the year in time for it to be epitomised in the Council's Report to the Annual Meeting.

Alteration in Rules

26.—Alterations in the Rules must be sanctioned by a majority of not less than two-thirds of the Members present and voting at the Annual Meeting, or at a Special Meeting called for that purpose, and no alterations shall otherwise be made.

To the Honorary Secretary,

Bournemouth Natural Science Society,

39, CHRISTCHURCH ROAD, BOURNEMOUTH.

Dear Sir,

I beg to propose that

M.....

(Please give Christian name in full, and state title—Mr., Mrs., Miss, etc., and any degrees or qualifications.)

Address..... .....

.....

**who is personally known to me*
**who has produced satisfactory credentials to me* *be elected an* **Ordinary* **Associate*

Member of the Society.

Date..... *Member's Signature* .....

I beg to second the above proposal

Date..... *Member's Signature*.....

*Delete word not applicable. See extract from Rules on reverse of this form.

Annual Meeting, 1927.

THE Twenty-fourth Annual Meeting was held at 39 Christchurch Road on Saturday, October 15th, at 3 p.m., the Chair being taken, in the absence of Mr. J. H. Ralph Smythe through illness, by the Rev. C. O. S. Hatton. The Minutes of the last Annual Meeting and the Council's Report for the past year were read by the Hon. Secretary; and the Hon. Treasurer presented his Annual Statement of Accounts, drawing attention to the absence of a Library Grant and a reduction on the Museum Grant, with an increase in the charge for heating and an outlay of £21 15s. on an Index of the Society's Reports and Proceedings from 1903 to 1923, a useful volume compiled by the Hon. Editor, Mr. J. R. White, M.A. A £30 Debenture has been paid off.

After a discussion on various items of expenditure, the adoption of the Report and Statement was moved by Dr. Hurry, seconded by Dr. Burstal and carried. A cordial vote of thanks to the retiring President, Mr. Heywood Sumner, F.S.A., for his excellent work during the year, was proposed by Dr. Penrose and seconded by Colonel Anderson; the Chairman proposed Mr. Sumner's re-election to the office of President; both of these motions were carried by acclamation, and Mr. Sumner briefly returned thanks.

The officers of the Society were re-elected on the proposition of Dr. Shann, seconded by Miss Pestell, and also the Members of the Council, proposed by Miss Curme and seconded by Miss Fryer. Mr. L. Beeching Hall had been nominated Chairman of the Botanical Section, in the room of Rev. C. O. S. Hatton. This appointment and the re-election of other Chairmen of Sections was proposed by the Chairman, and approved. Dr. Crallan, who had officiated as Acting Chairman of the Physical Section since the death of Mr. Painter, being unable to carry on, the office is now vacant. A vote of thanks to the Hon. Auditors was passed and their re-election was proposed by Mr. Hayes Barratt, seconded by Miss Rooke, and carried. A vote of thanks to the Chairman, proposed by Mr. Longbottom and seconded by Mr. Arthur Gray brought the formal business to a close: after which the Meeting decided, on the suggestion of Mr. James Druitt, to send to Mr. J. H. Ralph Smythe an expression of sympathy in his illness and a sincere hope for his speedy recovery.

Council's Report, 1927.

THE Twenty-fourth Annual Report of the Council. Since the last Annual General Meeting there has been an increase of 13 in our numbers.

Last year the number of members was 595, it is now 608. There are now only 8 original Members left. The number of Honorary Members is 12, and of Associate Members 19.

We also have 4 Past Presidents on our roll.

During the past year the following General and other Meetings have been held :—

Annual Meeting
Presidential Address
6 General Lectures
56 Sectional and other Meetings
8 General Excursions
41 Sectional Excursions

making a total of 113 Meetings and Excursions.

General Lectures and Meetings.

(*Illustrated by Lantern Slides.)

1926.

Oct. 16.—Annual General Meeting.
Oct. 23.—Presidential Address, by Mr. Heywood Sumner, F.S.A., "New Forest and Old Woods."
*Oct. 29.—"Brittany," by Mr. R. K. Cardew, B.A.
*Nov. 13.—"Economics of Coal," by Prof. W. A. Bone, Ph. D.
*Dec. 11.—"The Pipes of all Nations," by Mr. R. Quick, F.S.A. (Scot.).

1927.

*Jan. 8.—"Episodes in the History of Sherborne," by Dr. H. W. Pigeon, M.A., M.B., M.Ch., F.R.C.S.
*Jan. 14.—"Interesting Stories about Animal Life," Children's Lecture, by Mr. Claude Lyon.
*Jan. 22.—"Some Total Eclipses, and the Total Eclipse of June 29, 1927," by Mr. F. W. Longbottom, F.R.A.S.

Sectional Lectures and Meetings.

Archæological and Historical Section.

1926.

Nov. 15.—"Life in a Monastery," by Mrs. Eric Sharpe.
*Nov. 29.—"The Congress of the South Eastern Union of Scientific Societies" at Colchester, by Col. J. R. Dodd, M.D., F.R.C.S.
*Dec. 4.—"Life in Mediæval England," by Mr. S. W. Robins, F.R.G.S

1927.

Jan. 17.—"Roman Roads," by Col. E. B. Anderson, C.B.E.
Feb. 5.—"Something about Coins," by Mr. F. W. Longbottom, F.R.A.S.
Feb. 28.—"Mediæval Fortifications," by Mr. F. H. Dixon.
March 1.—"Recent Discovery of a Hoard of 12 Bronze-Age Palstave Axes," by the President, Mr. Heywood Sumner, F.S.A.
*March 23.—"Art Before History," by Mr. A. V. Grubb.
*March 24.—"Carnac and the Morbihan," by Mr. A. J. Nicholson, J.P.

Botanical Section.

1926.

*Nov. 4.—" The Fertilization of Flowers,"
by the Rev. C. O. S. Hatton, B.A., F.L.S.

Dec. 7.—" Plants found in 1926," by Mr. L. Beeching Hall, F.L.S.

1927.

*Jan. 27.—" Insectivorous Plants,"
by the Rev. C. O. S. Hatton, B.A., F.L.S.

Feb. 24.—" Some Hampshire Plants," by Mr. L. Beeching Hall, F.L.S.

March 31.—" Notes on the Flora of the New Forest,"
by the Rev. C. O. S. Hatton, B.A., F.L.S.

In addition to the above, five Informal Meetings of the Section have been held during the winter session, at which the following short addresses were given and rare specimens of plants were exhibited and discussed:—

1926.

Nov. 30.—" The Classification of Fungi," by Mr. J. Vorse.

1927.

Jan. 11.—General Discussion on matters of interest.

Feb. 8.—" Two Plants new to Britain,"
by Mr. L. Beeching Hall, F.L.S.

March 8.—" The Permanence of Colour Variety,"
by Miss S. G. Rooke.

April 14.—" Daffodils," by Mr. H. Backhouse, F.R.H.S.

Entomological Section.

1926.

Nov. 26.—Exhibition of Objects of Interest, and Discussion on Future Arrangements.

Dec. 9.—" Remarks on the Collection of Lepidoptera in the Society's Museum," by Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S.

1927.

Jan. 19.—" Eyes of Insects,"
by Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S.

Feb. 16.—" A few remarks on some Texas Wasps,"
by The Chairman, Mr. Howard Lacey, B.A.

*March 16.—" Flies' Teeth," by Mr. S. Whitaker.

Geographical Section.

1926.

Nov. 12.—" Looking Backward," by Mr. Claude Lyon.

*Nov. 20.—" Visit to Barbados, Trinidad and Central America," Part I.

*Dec. 18.— ,, ,, ,, ,, Part II.,
by Alderman H. Robson, J.P.

1927.

*Jan. 15.—" A Holiday in the Himalayas,"
by Col. C. A. R. Hutchinson, D.S.O.

*Feb. 19.—" Munich, the Art City of Germany,"
by Mr. R. Quick, F.S.A. (Scot.).

*March 11.—" California," by Mrs. Greg.

*March 19.—" A Trip to Venice," by Mr. Claude Lyon.

April 23.—" At Home." Discussion on " Looking Forward " opened by Mr. Claude Lyon.

Geological Section.

1926.

Oct. 27.—" Geological Epochs and their Meaning,"
by Mr. H. Bury, M.A., F.L.S., F.G.S.

1926

*Nov. 19.—"Volcanic Features of Teneriffe and Palma," by the Rev. C. V. Goddard.

Dec. 17.—"The Measurement of Geological Time," by Mr. H. Bury, M.A., F.L.S., F.G.S.

1927.

*Jan. 28.—"Marble," by Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S.

*Feb. 4.—"Geology and English Scenery," by Mr. R. K. Cardew, B.A.

Microscopical Section.

1926.

Oct. 20.—Exhibition of Objects of Interest, especially "Plant Hairs."

Nov. 17.—Objects of Interest, especially "Objects under Polarized Light."

Dec. 15.—Objects of Interest, especially "Insect Anatomy."

1927.

Jan. 19.—Objects of Interest, especially "Insect Anatomy" (Part II.)

Feb. 16.—Objects of Interest, especially "Hairs and Spines of Insects."

March 16.—Objects of Interest, especially "Stings and Ovipositors."

*April 20.—Objects of Interest, especially "Diatoms."

May 18.—Objects of Interest, especially "Pond Life and Botanical Sections."

June 15.—Objects of Interest, especially "Pond Life and Diatoms."

July 20.—Objects of Interest, especially "Minute Animal Forms."

Aug. 17.—Objects of Interest, especially "Pond Life."

Sept. 21.—Objects of Interest, especially "Sori of Ferns."

Photographic and Record Section.

1926.

*Nov. 23.—"Amateur Photographer" Prize Slides. Mr. W. Dieselhorst, A.M.I.C.E.

1927.

*Feb. 12.—"Lantern Slides taken at Excursions," and others, Mr. W. Dieselhorst, A.M.I.C.E.

Physical Section.

1927.

*March 26.—"Water," by Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S.

*April 2.—"The Principles and Theory of Wireless Broadcasting," by J. H. A. Whitehouse, Esq. (the Official Lecturer of the British Broadcasting Corporation).

Zoological Section.

1927.

Jan. 21.—"A Talk on Marsh Birds," by Dr. S. H. Snell.

*Feb. 3.—"Bird Life in the Arctic," by Dr. Longstaff.

*March 3.—"Notes on British Snakes," by Mr. L. Beeching Hall, F.L.S., and "Some Experiences with Snakes," by Mr. Howard Lacey, B.A.

General Excursions and their Leaders.

1927.

May 20.—H.M. Dockyard, Portsmouth, Rev. A. G. Yates, M.A., R.N.

June 11.—Sherborne, Mr. Claude Lyon.

July 5.—Portland, Mr. R. K. Cardew, B.A.

Aug. 10.—Old Sloden, New Forest, The President, Mr. Heywood Sumner, F.S.A., and the Rev. A. G. Yates, M.A., R.N.

Aug. 23.—Corhampton and Meonstoke, Dr. S. H. Snell.

Sept. 10.—Studland, Mr. H. A. Richey, B.A.

Sept. 17.—Stourhead, Mr. H. A. Richey, B.A.

Oct. 8.—The New Pavilion, Bournemouth, Mr. E. Dodshon, LL.B.

Sectional Excursions and their Leaders.

1927.

April 28.—Hinton, Rev. C. O. S. Hatton, B.A., F.L.S. (Botanical).
April 30.—Roman Road, from Badbury Rings to Poole Harbour, Col. E. B. Anderson, C.B.E. (Archæological and Historical).
May 4.—Wareham, Mr. Howard Lacey, B.A. (Botanical and Entomological).
May 12.—Hurn, Miss S. G. Rooke. (Botanical and Entomological).
May 16.—Branksome Chine, Mr. Henry Bury, F.G.S., M.A., F.L.S. (Geological).
May 17.—Verwood, Major T. C. Moore, I.M.S. (Botanical and Entomological).
May 21.—Avebury, and Silbury Hill, Mr. R. K. Cardew, B.A. (Archæological and Historical).
May 24.—Studland and Ballard Down, Mr. H. J. Wadlow. (Botanical and Entomological).
May 30.—Corfe, Miss Rogers-Barns. (Botanical and Entomological).
June 2.—Abbotsbury and the Swannery, Dr. F. G. Penrose, F.R.C.P., F.Z.S., M.B.O.U., and Mr. Howard Lacey, B.A. (Zoological).
June 7.—Chettle, Miss C. H. Fryer. (Botanical and Entomological).
June 8.—Winchester and St. Cross, Mr. W. Dieselhorst, A.M.I.C.E. (Photographic and Record).
June 10.—Brook, Isle of Wight, Mr. St. John Burton, F.Z.S., F.G.S., F.L.S. (Geological).
June 14.—Forest Lodge, Hinton and Burley, Mr. J. Vorse. (Botanical and Entomological).
June 16.—Colbourne's Wood, Bransgore, Rev. C. O. S. Hatton, B.A., F.L.S. (Botanical and Entomological).
June 21.—Garden Party. (Botanical).
June 23.—Swanage, Mr. Howard Lacey, B.A. (Botanical and (Entomological).
June 27.—Knowlton Ring, Witchampton and Buzbury Rings, Col. J. R. Dodd, M.D., F.R.C.S. (Archæological and Historical).
July 1.—Pepperbox Hill, Mr. Howard Lacey, B.A. (Botanical and Entomological).
July 2.—Stonehenge and Woodhenge, Col. E. B. Anderson, C.B.E. (Archæological and Historical).
July 6.—Stanpit, and Prichard's Nurseries, Christchurch, Rev. C. O. S. Hatton, B.A., F.L.S. (Botanical and Entomological).
July 11.—Poole Pottery Works, Mr. Claude Lyon. (Geographical).
July 12.—Brockenhurst, Mr. J. Vorse. (Botanical and Entomological).
July 14.—Studland and Swanage, Mr. W. Munn Rankin, M.Sc. (Geological).
July 19.—Sowley Pond, Rev. C. O. S. Hatton, B.A., F.L.S. (Botanical and Entomological).
July 26.—Worbarrow Bay, Mr. W. Munn Rankin, M.Sc. (Geological).
July 27.—Arish Mell, Mr. H. J. Wadlow. (Botanical and Entomological).
Aug. 4.—Hengistbury and Mudeford, Rev. C. O. S. Hatton, B.A., F.L.S. (Botanical and Entomological).
Aug. 6.—Heron Court, Mr. Claude Lyon. (Geographical).
Aug. 9.—Shapwick, Mr. R. K. Cardew, B.A. (Botanical and Entomological).
Aug. 16.—Hinton to Milton, Mr. J. Vorse. (Botanical and Entomological).
Aug. 25.—Wool, Mr. R. K. Cardew, B.A. (Botanical and Entomological)
Sept. 1.—Wareham, Redcliff and Ridge, Mr. L. Beeching Hall, F.L.S. (Botanical and Entomological).

1927.

Sept. 7.—Meare Lake-Village, and Glastonbury Museum, Col. E. B. Anderson, C.B.E. (Archæological and Historical).

Sept. 9.—Corfe and Thresher's Heath, Mr. Howard Lacey, B.A. (Botanical and Entomological).

Sept. 13.—Becton Bunny, Mr. St. John Burton, F.L.S., F.G.S., F.Z.S. (Geological).

Sept. 15.—Wimborne, Mr. L. Beeching Hall, F.L.S. (Botanical and Entomological).

Sept. 20.—Christchurch, Riverside and Meadows, Miss S. G. Rooke. (Botanical and Entomological).

Sept. 22.—Poole Gasworks, Mr. Claude Lyon. (Geographical).

Oct. 4.—Bournemouth Waterworks, Mr. Claude Lyon. (Geographical).

Oct. 11.—Fungus Foray, Brockenhurst, Mr. J. F. Rayner, F.R.H.S., M.B. Myc. Soc. (Botanical).

Of the General Lectures one of the most interesting was that on " The Economics of Coal," by Professor W. A. Bone, Ph.D., D.Sc., F.R.S., Professor of Chemical Technology, South Kensington, a leading authority on coal and its scientific uses. He dealt, in a thoroughly practical manner, with the economic position and the difficulties of the coal trade. His lecture was illustrated by many statistical slides and tables, made by himself as a result of his own researches. It was a valuable lecture, and appropriate in coming just after the great coal strike, and was greatly appreciated by the audience.

The Sectional Lectures reached a high standard of merit, and many call for special notice. Among the outstanding ones are :—" An Account of the Recent Discovery of a Hoard of 12 Bronze Age Palstave Axes," with illustrations, by the President, Mr. Heywood Sumner, F.S.A.; " Life in Mediæval England," by Mr. S. W. Robins, F.R.G.S. Mr. Robins made the middle ages live. " Art Before History," by Mr. A. V. Grubb, being an account of recent discoveries in Pre-historic Cliff Dwellings. " Some Hampshire Plants," by Mr. L. Beeching Hall, F.L.S. " Diatoms," by Mr. F. B. Taylor, B.A. This lecture was profusely illustrated by lantern slides showing an apparently infinite number of different kinds of Diatoms.

The General Excursions, 8 in number, were all interesting and instructive. Details of some of these and also of some of the more attractive Sectional Excursions will be found in the Proceedings, pp. 38-52.

At the last Annual Meeting Mr. Hubert Painter, B.Sc., F.C.S., retired from the office of President, after holding it for two years. He was unable to be present at the meeting owing to his illness. He was one of the original members of the Society, most zealous and energetic, and had occupied almost every single official post in the Society, ending with the Presidency, on his retirement from which he was accorded a most sincere vote of thanks for all his work for the Society, together with heart-felt wishes for his recovery to health; but he died very shortly afterwards.

The new President, Mr. Heywood Sumner, F.S.A., was unanimously elected as President for the year 1926-1927. Mr.

Smythe, in proposing him, spoke very highly of the excellent work done by Mr. Sumner in the field of antiquities, and gave a long list of the volumes which he had published.

Mr. Sumner gave his Presidential Address on Saturday, October 23rd, the title being :—" New Forest and Old Woods." He dealt with the question of how to set about re-stocking with fresh growth some of the decaying woods of the New Forest, speaking highly of the plan of " Natural Regeneration " and the necessity of temporary enclosures to preserve the young trees from the ravages of grazing animals.

The Council is very pleased to announce that Mr. Sumner has kindly consented to allow his name to be submitted for election as President for the coming year, 1927-1928.

The Exhibition of Wild Flowers in the vestibule of the Lansdowne Free Library (initiated in 1917 by the late Miss Agnes C. Rooper) maintains the interest taken in it from its commencement by visitors and residents alike. Numerous enquiries have been made and answered, and plants sent there for identification. Owing to the unfavourable season, the Exhibits have not been so many as in previous years, but have been of interest, as they included many from distant counties. As usual, the show has the approval and support of the Bournemouth Educational Committee. The work has been again carried on by Miss Rooke and Mr. Wadlow, assisted by Mrs. Garnett, Miss S. Wetherell and Miss Willis.

The following members have given plants for the garden :— Dr. Crallan, Mr. J. H. Ralph Smythe, Dr. J. B. Hurry, Colonel E. B. Anderson, Miss Pestell, Mrs. Rothwell, Mrs. Curme and Mr. H. Backhouse.

Other donations include a large number of Books given by various members; a Boar's Head, given by the Rev. C. V. Goddard ; a Quern found in the North Cemetery at Bournemouth, given by Mr. J. H. Scott, M.E., M.I.M.C.E. ; a Bronze Palstave found in Talbot Woods, given by Col. E. B. Anderson, C.B.E. ; Flints, and specimens of Tropical Insects, given by Miss Lupton ; Flints from the recent Pokesdown Excavations, with a Report on the subject, given by Dr. R. C. C. Clay, M.D., F.S.A.

At the Council Meeting held on May 31st, 1927, the Rev. E. J. Douglas Simpson, M.A., was elected, by co-option, to fill a vacancy on the Council.

The Council wishes to express its thanks to the following ladies for their help at the Teas during the Winter Session :— Miss M. Wetherell, Miss McBean, Mrs. Thill, Mrs. Rees Howell, Miss Ousby-Trew, Miss Rooke, Miss A. Veale, Miss B. Veale and Miss C. Veale. The Council also thanks those members who so kindly worked the Lantern for the various illustrated Lectures,

viz., Messrs. Dieselhorst, Dodshon, Hayes Barratt, Lyon, Spencer, Wadlow, Whitaker, Williamson, and Surgeon-Captain Borrett, R.N.

The South-Eastern Union of Scientific Societies held their meetings at Hastings this year, and, once again, our Delegate was Col. J. R. Dodd, M.D., F.R.C.S. He presented a full and interesting Report to the Council, for which he received the Council's grateful thanks. An abstract of this Report is printed in this volume of the Society's proceedings.

The British Association for the Advancement of Science held their meetings at Leeds in September, and Mr. Claude Lyon was once again our Delegate.

The Council reports with deep regret the loss by death during the past year of Mr. Hubert Painter, our recent President for two successive years. He died, somewhat unexpectedly, at the comparatively early age of 65 years. His health had, for some months, been a cause of anxiety to his many friends. He had done valuable work in the cause of Science during his 30 years' association with the town. He was an original member of the Society. He was held in affectionate esteem by all.

The death of another original member has to be reported, viz., that of Mr. Joseph Neale. He died in June at the age of 73. He was the Chairman of the Entomological Section, resigning that post only a few months before his death. He endeared himself to his fellow-members of the Council and to those who attended his Lectures by his fund of genial humour. Like the rest of that remarkable band of original members, of whom we may all feel proud, his whole heart was in the interests and welfare of the Society.

Other losses by death are:—Mr. R. E. Carter, Sir Ronald Macdonald, K.C.I.E., C.B., D.L., LL.D., Colonel Commandant R.E.; Dr. Uhthoff, F.R.C.S.; Mr. T. R. Wingfield; Mr. J. C. Ellis; Dr. A. D. Edwards, M.B., B.Sc., D.P.H.

The Council regrets to say that the following three Sections are without Chairmen, viz.:—The Astronomical, the Mathematical and the Physical. With regard to the last of these, on the death of its Chairman, Mr. Painter, the vacancy was temporarily filled by Dr. Crallan, who most kindly agreed to take the position of Acting Chairman until the end of the lecture season; this kindness of Dr. Crallan's coming in addition to his numerous other services, was greatly appreciated by the Council. They hope that the vacancy will now soon be filled.

In the recent discovery of a Pre-historic Burial Ground at Pokesdown members of the Society took a leading part in arranging for the excavations and for the preservation of the relics discovered there under the zealous leadership of Col. E. B. Anderson, C.B.E.

The Council has great pleasure in announcing that a valuable General Index to the complete set of Reports and Proceedings of the Society, relating to the first twenty years of its existence, has just been completed by the Hon. Editor, Mr. J. R. White, M.A., and is now on sale, price one shilling. They feel that the Society is greatly indebted to Mr. White for accomplishing this arduous task.

In conclusion, the Council desires to express its thanks to all who have presented objects of interest and of use, or given lectures, or conducted Excursions; and especially to owners and occupiers who have kindly permitted the Society to visit the several places of interest controlled by them.

Summary of Accounts for the Year ending 30th September, 1927.

Current A/c.

RECEIPTS.

	£	s.	d.
Members' Subscriptions	498	10	0
Donations	8	16	0
Sale of Natural History of Bournemouth	6	13	2
Sale of Proceedings	1	8	0
Sale of Index to Do.	1	17	0
Rent from Tenants	130	0	0
Letting of Hall	1	2	6
Donation for Library	1	10	0
Surplus from Excursions (including £15 0s. 7d. received in previous year, too late for account) ...	37	2	11
	687	4	7
Balance from last year	73	12	10
	£760	17	5

PAYMENTS.

	£	s.	d.
Rates and Taxes	82	0	8
Interest on Debentures ... 180 15 8			
Less Tax 36 3 3			
	144	12	5
Salaries, Wages, Insurance Stamps ...	118	15	4
Printing and Stationery	38	15	9
Vol. XVIII. of Proceedings	63	5	10
Towards Cost of Vol. XIX. of Do. ...	2	5	6
Cost of Printing Index to Do.	21	15	0
Postage	27	16	2
Water, Lighting and Heating	36	1	5
Subscriptions to other Societies	2	3	6
Furniture and Maintenance	40	17	1
Insurance	9	5	3
Museum and Collections	1	11	0
Library, Papers, etc.	2	9	4
Expenses of Lectures	5	7	6
Share of Telephone Rent	3	3	0
Cost of Wild Flower Exhibition	1	10	8
Extra Labour, etc., for Garden	6	8	4
Grant to Pokesdown Excavation Fund ...	4	0	0
Debenture Redeemed	30	0	0
Sundries	1	17	0
	644	0	9
Balance at Bank	116	16	8
	£760	17	5

Summary of Accounts for the Year ending 30th September, 1927.

Deposit Debenture A/c.

RECEIPTS.	£	s.	d.
Balance from last year	64	15	0
Interest to 31st Dec., 1926	1	11	11
	£66	6	11

PAYMENTS.	£	s.	d.
Balance on Deposit	66	6	11
	£66	6	11

G. BRUMELL,
Hon. Treasurer,
10th October, 1927.

We have examined the above Statement with the Books of the Society and the Vouchers for Payments and certify the same to be correct.

(Signed) EDWARD BICKER & SON,
Incorporated Accountants.
C. H. BLACKETT,
Hon. Auditor.

Report of Summer Excursions, 1927.

Avebury. By a happy plan of the Archæological Section, members have been enabled this year to visit the two greatest monuments of antiquity in this country, Avebury and Stonehenge. The latter had been visited 7 years ago, the former never. For the former excursion, on May 21st, a route had been mapped out by Mr. Cardew along the high ridges of the downland by Longbarrow to Devizes; thence, climbing to a still higher level and crossing the Wansdyke, direct to Silbury. Here a long halt was made, enlivened by lunch, an address from the leader, and a heavy rainstorm which proved only the precursor of a lovely afternoon. Of the great hill of Silbury, its origin and purpose, nothing is certainly known. Its gigantic size would seem to preclude the possibility of human agency, for it stands on a circular base of 5 acres with a diameter of 550 feet, tapering to a breadth of 100 feet in a rise of 130 feet. Excavations and tunneling have given no clue to its mystery, though it is conjectured that both Silbury and Avebury had a religious origin, possibly connected with sun worship. It is a curious fact that the distances of Avebury and Stonehenge from Silbury are proportional to the distances of the Sun and Saturn from the Earth.

Avebury has been described as the greatest megalithic monument in the world, the supposed parent of Stonehenge, the wonder of Britain, and the most ancient as well as the most interesting relic which our island can show. An adequate account of it is impossible here, but reference may be made to an excellent description of it in a volume of the series known as "The Little Guides." Within the mighty prehistoric rampart lies the modern village, quarried out of the huge monoliths of which only a few remain to indicate the scale of the ancient monument. Just beyond these bounds lies a beautiful 16th century Manor House, with fine gabled front, a circular columbarium and a charming garden; and, hard by, the Church, notable for a Norman doorway, large hagioscopes, and a curious tub-font, possibly Saxon but with later ornamentation.

A fine contrast to the bleak uplands was enjoyed on the home journey. A long climb to a height of 900 feet at Milk Hill was rewarded by a glorious view of the Marlborough Downs. Then came the descent to the valley of the Avon, which was closely followed, practically from its source, through Amesbury to Salisbury. It would surely be difficult to find in England a more beautiful river drive, running for a dozen miles through the heart of Salisbury Plain.

St. Cross and Winchester.

On June 8th a party, not too numerous, shared the delights of a wonderful day, under the leadership of Mr. Dieselhorst, Chairman of the Photographic Section. Winchester is so packed with varied interest that cameras suffered rather from an embarras de choix, and it was certainly wise to make sure of Saint Cross on the outward journey. It is "the most ancient active charitable institution in the country, and the most beautiful group of mediæval buildings yet remaining to us." The charter of the founder, Bishop Henry de Blois, delivered in 1151 to the Prior of the Knights Hospitallers, provided for "thirteen poor, impotent men, and so reduced in strength as rarely or never to be able to raise themselves without the assistance of another," and in addition to this 100 other poor men "of good conduct" were to be entertained daily to dinner. But the Trust was scandalously administered and the funds diverted to the profit of wealthy pluralists for many generations, until drastic reform was undertaken by William of Wykeham, as Bishop and patron, and continued by his successor, Cardinal Beaufort, who, in 1445, added a hospital or almshouse of "Noble Poverty," designed for two priests, 35 brethren and 3 sisters. Those of the new foundation still wear a cloak of deep red, while those of the old foundation retain the black cloak and silver cross-potent as ordained by the Hospitallers.

Unhappily the good Cardinal's scheme was frustrated by further and grosser corruption, and it was not till 1855 that a wholesome scheme of administration was devised, by which the brethren now enjoy ample lodging (even married quarters), daily rations and a money allowance, besides a small garden plot to cultivate.

The Wayfarer's Dole of bread and beer is still to be had at the lodge by genuine tramps, and a miniature ration is supplied to visitors on request.

The Master's house is now outside the precincts, but he retains his ancient garden with fishpond, which the party was permitted to visit. All the old buildings are occupied by the brethren; the dining-hall, now only used on special occasions, contains black-jacks, pewter vessels, and other relics; and the kitchen displays a fireplace of generous proportions. On the East side of the inner court runs a Jacobean ambulatory with infirmary above, and at the South rises the great late-Norman church, similar in character to Romsey Abbey, but suffering internally from certain regrettable decorations in 1861. For an account of its grandeur and of the details of its architecture, reference may be made to the Archæological Journal for 1902.

So fascinating is Saint Cross, that it was difficult to collect the party and to get away into the city. Regret was, however, soon forgotten in the pleasant Deanery garden which had been kindly placed at our disposal for lunch. Here are magnificent

plane trees and a superb lawn, and over all the dominating mass of the Cathedral. Afterwards a certain freedom was permitted, so that while most of the party made a careful tour with a guide round the chapels and tombs, others betook themselves to the Museum at the West Gate, or to the Great Hall in the Castle, containing King Arthur's Round table, or to Wolvesey Castle, shortly to become the Bishop's official residence; while a very few found their way to the War Memorial at the College, consecrated to the memory of 500 Wykehamists who gave their lives in the Great War, and surely one of the noblest and most inspiring monuments to be found in this country.

It may be added that the pleasure of the day was greatly enhanced by a twofold view of the Forest, the out-journey being made through Lyndhurst, and the return by way of Cadnam.

Brook, I. of Wight. A hardy band assembled at the abnormal hour of 7.30 a.m. on June 10th for this expedition, led by Mr. St. John Burton, F.G.S. Time had to conform to tide, so that Compton Bay might be reached at low-water for a thorough inspection of the so-called "Pine Raft," a huddled mass of large trees transported hither in bygone days and now exposed, imbedded in sandstone. Here are found fossil tree-ferns and cones, and along this coast line, notably at Atherfield and Sandown, have been unearthed remains of vast reptilians, revealed by landslips or by cliff denudation. Mr. Burton led the party to Brook Chine, and there described the Wealden Beds which form the neighbouring coast. The strata are of Mesozoic period, exhibiting an upward succession towards Freshwater Bay. The Wealden Beds are the oldest found in the island. They underlie the Lower Greensand and the other beds of the Secondary rocks seen at the North West end of the bay, the whole being grouped with the Cretaceous system, which includes both fresh-water and wholly marine elements. They comprise about 750 feet of Clays and Shales, accumulated over a wide subsiding area, under fresh-water, possibly lacustrine, conditions. In later Tertiary ages great upheavals brought up all these rocks, with the underlying chalk and eocenes, thus causing the bulk of the higher strata to assume an approximately vertical position in relation to the bedding planes. This formation is well seen also at Swanage, where its thickness exceeds 2,000 feet. Perfect weather enabled the examination of all these features to be carried out with great comfort before the party returned to Brook, and drove back to the pleasant garden of Shalcombe Manor House, and so home via Yarmouth.

Stonehenge. On July 2nd Colonel Anderson led a large party to Stonehenge and delivered in situ an illuminating address on the origin and structure of the monument, now

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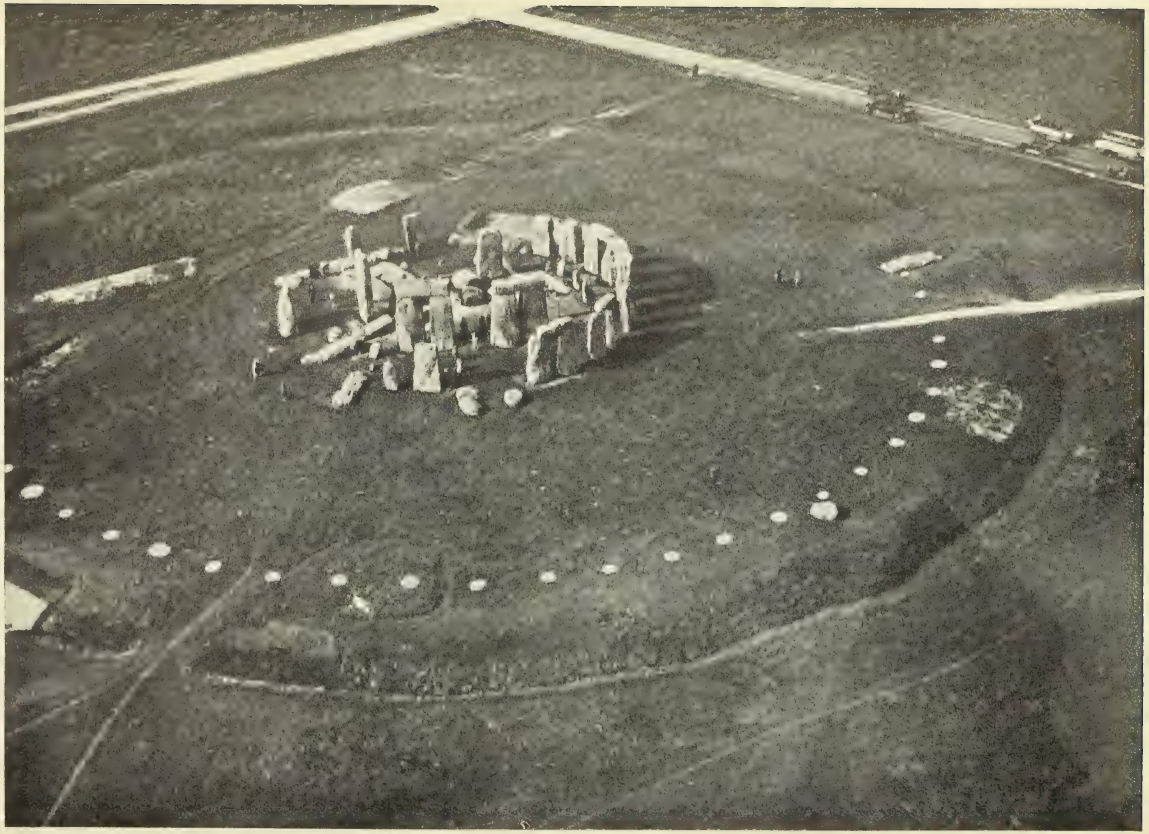


STONEHENGE

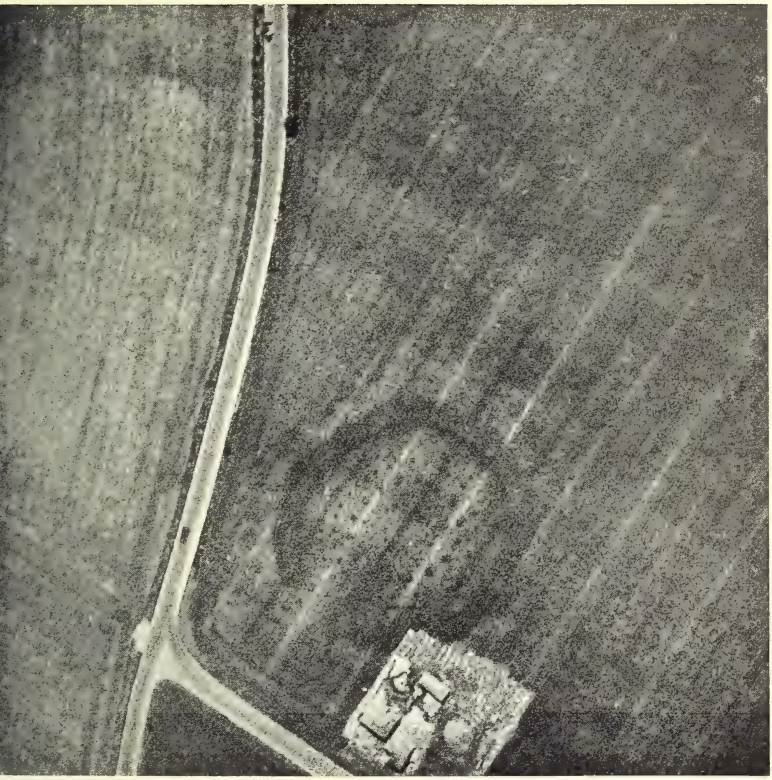
generally attributed to a period about 17 centuries B.C., and variously pictured as a temple, an astronomical instrument, or perhaps as a prototype of the Greek Agora or the Roman Forum. Excavations suggest the pre-existence of former monuments, of which the earliest would almost certainly have been sepulchral; and some support is given to this theory of relative antiquity by the existence of an outer ditch enclosing an earthwork 300 feet in diameter, and within the area 3 circles of holes or sockets for wooden uprights, besides many such scattered about, all presumably anterior to the monument itself. The material of which Stonehenge is constructed is two-fold; the huge Sarsen stones of the vicinity, and the igneous or " blue " stones, possibly ice-borne boulders, relics of a drift deposit and brought from afar, some think from South Wales, and dressed on the spot. The main structure begins with an outer ring, 108 feet in diameter, of Sarsen Trilithons, the lintels morticed to the uprights and toggle-jointed to each other. Of the original 30 uprights sixteen are still erect, of a height of 21 feet, uniformity being contrived by sinking to greater or less depth, and stability being secured in the latter case by a broader un-dressed base. Within this was a circle of 30 or 40 lesser, foreign, stones, of which 7 remain. Within this again was a series of 5 great Trilithons, rising gradually in height towards the south-west, and forming a horse-shoe opening to the north-east; and finally a parallel curve of smaller and less perfectly hewn foreign stones, of which there were perhaps 15, about 8 feet high. At the core of the whole structure is a single recumbent slab of micaceous sandstone, known as the " Altar Stone." This, together with the " Slaughtering Stone," a huge Sarsen 20 feet long, in the outer area, have given rise to the theory of Druidic origin or of Druidic use. Near by is the Hele Stone, or Friar's Heel, 17 feet high, which, viewed from the Altar Stone, marks the point of sunrise at the summer solstice. From the Hele Stone may be traced the Avenue, bounded by earthworks, running north for 500 yards. Then it divides, one branch turning east to an ancient ford on the Avon, the other continuing north to an earthwork, known as the Cursus, half a mile away.

Woodhenge. Two miles N.E. of Stonehenge, and thence approached by a wide circuit through Amesbury, is the site of an excavation now in active progress, on which, by a happy analogy, has been conferred the name of Woodhenge. On arrival the party was met by Mrs. Cunnington, who is keenly devoted to the work, and who kindly gave an extremely lucid account of the origin and the progress of the operations. The circular site, with rampart and mound, had been well known to antiquarians, but there had been no reason to differentiate it from an ordinary Disc Barrow, and it had not been opened. A chance

observation from an aeroplane in June, 1926, followed by photography from above, revealed curious patches in the cornfield, differing in tint and growth from the surrounding crop. It is well-known that a cultivated chalk-land will vary in productivity according to the depth of tillage or of the oversoil. It was therefore surmised that these patches, which formed an irregular circle, might be due to excavations at some remote period, though the purpose of them was not at first clear. It was thought that it might be profitable to explore the patches. When digging began in August it was soon apparent that the patches marked the positions of holes or sockets, large and deep enough to contain massive uprights. The sockets showed 3 vertical sides and the other a sloping rim or ramp. Operations on a large scale were at once undertaken and are still in progress, but enough has been done to make clear the plan of what appears to be a unique relic of prehistoric man. Six concentric rings have now been defined, the outermost, 250 feet in diameter, very nearly circular, the inner becoming more and more elliptic, until in the innermost the long and short axes differ by as much as 20 per cent. This consists of 12 holes, the next two 18 each, the next 16 holes, considerably larger than any other, the next 32 holes and the outermost 60. Across this ring a causeway has been opened up, flanked on either side by a ditch 25 feet broad and 7 feet deep, which, it is conjectured, runs round the whole area, inside the rampart formerly thought to be the boundary of the Disc Barrow. This causeway probably gave access to the innermost area, on the far side of which has been found the grave and skeleton of a young child. Besides this, and that of an adult below the floor of the ditch in the east section, no other human remains have, so far, come to light, though certain crude implements have been found. Traces of the supposed uprights remain in the sockets, and indicate the use of oak and hornbeam. The whole plan of this Timber Circle is suggestive of that of Stonehenge, and the monument is, so far, unique by reason of its structure as well as in its discovery by aerial photography.

In the plate, the light square patch is an uncultivated plot, and the parallel lines across the whole area indicate plough furrows.

Portland. On July 5th, after a lapse of 16 years, a visit to Portland was organised by Mr. Cardew, and, with the invaluable co-operation of Mr. H. J. Sansom, who is responsible for the working of the greater part of the quarries on the island, many of its interesting features were explored and explained. Mr. Sansom is the fortunate tenant of Pennsylvania Castle, which hangs, in a wooded dell, on the very face of the eastern cliff. It is a fine castellated mansion, with a pleasant lawn bearing a unique sun-dial of like date. It was built in 1800, at the suggestion of George III., by John Penn, then Governor,



WOODHENGE

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HISTORY.

who, while complying with what was really a Royal Command, cleverly secured a grant of the surrounding 25 acres of land, and conferred upon the estate the name which his grandfather, William Penn, had made more celebrated across the Atlantic.

The " liberty " of Portland is a Royal Manor, and retains various curious customs and privileges, among which may be mentioned (1) the system of land tenure known as gavel-kind, by which the estate of an intestate is divided equally among his sons; and (2) an easy mode of land-conveyancing, known as Church-gift, requiring merely the signatures of buyer and seller in the parish church in the presence of two householders. All land is freehold, subject to a tax of three-pence per acre, due to the Sovereign, whose revenue is thereby enriched by the lordly sum of fourteen guineas and threepence per annum. The assessment is made and the tax collected in a Royal court, now held in November, by the Reeve of the island. His office is tenable for a year and devolves automatically upon the payer of the highest individual tax for the year, though it may never be held twice by any person. His staff of office is a squared 10 foot pole, subdivided into five portions, representing the five ancient hamlets of the island. Upon this certain " notches " and " scratches " indicate the several payments to be made, a " whole notch " representing a shilling, a " half notch " sixpence, a " full scratch " a penny and so on. The Reeve provides his own staff, which passes to his descendants as a much-prized heirloom.

The whole life of the island, of course, centres in the quarries, a portion of which is retained by the Crown and worked by convict labour under a royalty of sixpence per ton. Of the rest, the greater part seems to be now in the hands of the Bath and Portland Stone Company, whose operations comprise all stages, from the rough quarrying up to the finished article ready for building purposes. Saws of different patterns deal with varied requirements, and an army of skilled masons perform the more delicate shaping and carving.

Portland stone appears to have been quarried as early as the 14th century for the construction of Exeter Cathedral; and it was employed by Inigo Jones in 1610 for the Banqueting Hall at Whitehall. But its excellence was only fully established by Christopher Wren, who used it, after the Great Fire of London, in the rebuilding of bridges and of many city churches and, in particular, of St. Paul's, which alone absorbed over three-quarters of a million cubic feet of material.

So much of interest is there on the island, that a single afternoon is all too short to embrace the whole, so the party had to omit an inspection of the quarries, and to be content with a round of the stone works, followed by a bracing run to the extremity of the Bill, topped by the lighthouse, and exhibiting, right down into the thundering surf, the same massive geological formation. A visit was, however, paid to the 11th century pentagonal strong-

hold with 7 foot walls known as Bow and Arrow Castle, and to the ruins, hard by, of the old parish church, destroyed by a landslip which revealed traces of a more ancient church, possibly contemporary with the castle itself.

Fortunately for the complete success of the excursion, the day, which had begun in menacing fashion and with occasional showers, developed into glorious sunshine, and the home journey was made, under the best possible conditions, by way of Osmington Mill, where a suitable halt gave opportunity for refreshment, followed by a scramble round the pretty waterfall which tumbles to the beach, and a brief inspection of the very interesting geological structure of the cliffs.

Heron Court. After an interval of 11 years a visit was paid on August 6th to this interesting house and grounds, and once more the Earl of Malmesbury personally acted as cicerone, enlivening the tour of the state rooms with vivid comment on the historical associations which cluster round many of his treasures. The walls display great wealth of family portraits, among which were specially noted one of James Harris by Joshua Reynolds, when both were young inconspicuous men, and another when both had acquired fame, one as 1st Earl of Malmesbury, and Ambassador at the Court of Catharine of Russia, and the other as the great portraitist and the first President of the Royal Academy. A later portrait of the Earl by Lawrence is perhaps the gem of the whole collection, though Romney, Landseer, Rubens, Hoppner and Canaletto are also well represented, and there is a fine trio of ancient London by David Scott. Attention was also drawn to the famous Chinese Screen in the dining room, and to two admirable pieces of Flemish tapestry in the hall.

The house itself is not conspicuously beautiful. It occupies the site of a manor farm attached in early days to the Priory of Christchurch. But not much that is ancient now remains, the Tudor manor house having been much cut up and disfigured by a stucco facing in a bad period, early 19th century. The park is extensive, and it is said that the area under timber is over 2,000 acres. In the neighbourhood of the house are splendid examples of the Monterey pine (Pinus insignis), the Swamp Cypress (Taxodium distichum), the Lebanon Cedar and others. A cluster of four Scots Firs on the south lawn was raised from seed brought from Scotland after Culloden in 1746, and, if this tradition be true, they antedate by some 30 years the re-introduction of the Scots Fir into the New Forest.

The interest of the excursion naturally centred in Heron Court, but the morning was pleasantly spent in a round of less frequented portions of the forest, and the day brought to a close

by a reunion by the riverside at Wimborne. The whole arrangements were devised and carried out by Mr. Claude Lyon with complete success.

Old Sloden. In his Presidential Address for 1926, Mr. Heywood Sumner gave a comprehensive account of the current controversy resulting from the proposed Forest regulations formulated by the Commissioners, and suggested a future excursion to enable members to see something of the results of the scheme of Natural Regeneration promoted by the Forestry Commission. The suggestion was warmly supported, and on the 10th August Mr. Sumner conducted a large party to Old Sloden, and explained in situ the operation of the experiment. Old Sloden is a moribund plantation; the standing trees are long past their prime; a couple of hundred years will, no doubt, see them dead. The seedlings which might take their place are destroyed by rabbits, cattle, ponies or deer, or subsequent cropping prevents their development. The only way, then, to stop the depredations of enemies is to keep them off until the tree is high enough to be out of reach of attack. Two small wire-netted square enclosures were visited, where the Commission is promoting Natural Regeneration. In order to see what effect standing bracken has on the growth of seedlings, it has been removed from only half the enclosure, in one case on a diagonal line, in the other on a transverse bisecting parallel sides; clearly visible, in each case, on the free portions were healthy seedlings in considerable number, chiefly oaks, some beech, one or two whitebeams.

The day's programme was not limited to these investigations. On the way to the enclosures a halt was made at a Roman pottery site, excavated by Mr. Sumner some seven years ago; and a minute explanation was given of the way in which the kiln was constructed and the earthenware stacked and fired. Drawings to scale and in colour were exhibited, and also specimens of the ware actually discovered in the neighbourhood. Fritham pottery was famous in the south, and widely distributed by pedlars, for indubitable specimens have been found as far away as Richborough and Reculver in Kent. From the absence of defensive earthworks at any of the sites it is inferred that the manufacture was carried on in a period as peaceful as our own, ceasing with the Roman occupation.

After viewing an Elizabethan encoppicement earthwork, still traceable round an area of some 61 acres, the party moved on to a small square enclosure surrounded by a broad wasted bank and a silted-up ditch; this was possibly a cattle-fold or pig-pound, and, from its structure, of Roman origin. Three other similar enclosures are known in the Forest—Studley Castle; Church Place, Denny Wait; and Church Place, Ashurst.

The walk ended at the edge of the wood with a wide view over Cranborne Chase, and, after a short drive, the day was brought to a pleasant conclusion in the riverside garden at Fordingbridge.

Corhampton. On August 23rd an entirely novel round was carried out by Dr. Snell in the Meon valley and over the downs to Winchester. It was not quite clear whether the main object of the day was the Cotton Museum in the City, with its fine collection of birds, or the archæology of the churches at Corhampton and Meonstoke. Each had its full measure of interest, and there was afforded also, en passant, a tantalising glimpse of the ruins of the Palace at Bishop's Waltham, suggesting an object for a future excursion.

Meonstoke contains a thirteenth century font of Purbeck marble. At Corhampton the font with its cable moulding is even more ancient, and there is in the chancel a remarkable stone sanctuary seat, a stone altar slab with six crosses, and some interesting remains of frescoes. The north doorway, now blocked up, shows a plain semi-circular head and jamb cut straight through the wall. In the churchyard is a British-Roman sarcophagus with lead coffin, of date about 300 A.D., found, containing a skeleton, in 1917, and also a magnificent yew, 20ft. in circumference and reputed to be 1,000 years old.

Meare Lake Village. On Wednesday, September 7th, a large party, led by Colonel Anderson, enjoyed the privilege of inspecting the new excavations and of hearing from Dr. Bulleid and Mr. St. George Gray the full account of the recent investigations which they have been carrying on since August 29th, as a sequel to their similar work at Glastonbury Abbey earlier in the summer. Somerset Lake Villages, it was explained, like those found on the Continent, consisted of many huts, circular in shape. The foundation was a platform of timber or brushwood, covered with clay, picketed by long posts to the bottom of the lake. As the platform sank in the marsh, others were superimposed, until sometimes as many as 12 or 14 were found, one on the top of the other. The hearth, mostly of baked clay, was placed near the centre of the hut. The roof, probably thatched, was supported by a centre pole; the sides were of wattle and daub, the remains of which, with finger marks in the daub, have been found in plenty. Glastonbury village had been surrounded by a palisade, and equipped with a causeway, probably for canoe traffic in fairly deep water. At Meare the water was shallower; after 2,000 years of settlement and shrinkage the clay floor and the alluvium above it rise to a total height

of 5ft. above the field level, which is barely 14ft. above mean tide level 10 miles away. Most of the querns found here are of the saddle type and a La Tène I. brooch has been found; while at Glastonbury the rotary quern predominated, and nothing earlier than the La Tène II. type was recovered, so that one settlement is probably a couple of generations older than the other. Most of the pottery found at Meare is hand-made, with highly artistic ornamentation; though last season another variety was unearthed, thin, greyish and lathe-turned, resembling the "black-lead" coated ware found at Hengistbury, and probably imported in the 2nd century B.C.

The bronze objects found quite recently include a perfect pair of tweezers, a finger-ring, half a bangle, and half a broad armlet, which appears to have been hinged to the lost-half, and suggesting in its design Hallstatt influence; also the greater part of an armlet of Kimmeridge shale with "knobbed" ornament of Hallstatt type. In iron, a length of thick twisted wire, forming a cable design and perhaps part of a torc, has been found in association with some grains of wheat. Pieces of tin and lead have also been recovered, and part of a crucible. So far this season no large quantity of timber, forming the foundations of the dwellings, has been revealed, nor any oak beams with mortise holes. A few piles have been met with, and a tapering pointed piece of wood (not a pile). Two of the typical clay hearths have been uncovered, presenting no new features, and more of the substructure will, no doubt, be exposed as the excavations proceed.

The ever-increasing Meare collection is handsomely housed in Taunton Castle. Glastonbury has its own Museum, and here the party had further opportunity of examining relics of bygone ages before passing into the ancient portal of the "George."

Becton Bunny. On September 13th a small band of enthusiasts, undismayed by the prospect, only too faithfully fulfilled, of really bad weather, followed Mr. St. John Burton in a close examination of this important section of the Hampshire Coast.

At the Bunny itself two conspicuous divisions are well shown, forming the western side of the chine for a little distance inland, until the exposures are no longer visible. These comprise the two highest beds attributed to the English Eocene series; and they can only be seen here and in the Isle of Wight, where they are not so well marked and are poorly fossiliferous. The lowest bed, resting on the shore, consists of 26 feet of sandy clay, containing a fauna reminiscent of the Barton clay; yet there are introductions of certain species not observed in that portion of the Eocene series. These would suggest changes occurring both in the mode of deposition and depth of water, such as would bring in an altered state of affairs, namely, the Lower Headon

freshwater beds of the Oligocene formation. Marine clay, occupying a somewhat anomalous position between two thick beds of sand, is clearly marked off from the transition bed (known as the Long Mead End bed), which contains an admixture of Eocene and Oligocene species in the higher part only.

An important statement was originally made by Sir Joseph Prestwich, concerning the affinities of these strata with those of the Paris Basin. They may be correlated with the Sables Moyens, a series of sands and sandstones having many palaeontological features in common with the beds under review, although the thickness of the French beds, referred to this horizon, is much less than our own and differs also to a considerable extent in lithological characters.

E. B. Tawney (1881) clearly pointed out that the supposed occurrence of Batillaria Concava (Cerithium) in the Long Mead End beds, was founded upon error, since the species was really identical with Lamarck's Cerithium Pleurotomoides, which although found in the Middle Eocene (Bracklesham beds) did not range above the Sables de Mortefontaine of the Paris basin. Thus, Tawney did much to cast doubt on Professor Judd's affirmation contained in a paper read before the Geological Society of London during the year 1880, which sought to include the Long Mead End sands with the Headon series (Oligocene).

Proceeding eastward of Becton Bunny, the party were enabled to secure some examples of the Cerithia; also to trace the bed containing these mollusca for a good distance. The lignite bands forming a conspicuous feature in the cliffs were duly noted and described by Mr. Burton. The green Oligocene clay resting on the highest lignitic band was pointed out.

During the afternoon some time was devoted to an exploration of the lower beds, westward of Becton Bunny. These comprise the Barton Sands, followed below by the Chama Bed. The Becton Bunny Marine bed was shown to rest upon buff sand, containing obscure casts of shells, and was extensively piped in parts. Former calcareous shells of Pelecypoda inhabiting this portion of the Barton beds have been destroyed long ago by the lack of a suitable protective matrix; but there is little doubt that the sands were at one time fairly rich in Molluscan organisms. Professor Forbes (1856) remarked on the fossiliferous condition of the Headon Hill sands (Barton sands) at Whitecliff Bay in the Isle of Wight.

Within one quarter of a mile of Barton Court, a part of the Chama bed was examined for fossils, and characteristic species brought to hand. Small portions of the hardened shell-band at the base were collected for reference.

The position of a clay-ironstone layer in the Middle Bartons was described, as also lithological and palaeontological changes on this horizon.

Stourhead. For details of this most attractive estate reference may be made to Vol. XIII of the Proceedings. Sufficient here to say that on September 17th the party, under the leadership of Mr. H. A. Richey and favoured with brilliant sunshine, saw everything—the Tower, the Grottos, the grounds, the Cross, the Church—to the greatest advantage.

Gasworks. Under the leadership of Mr. Claude Lyon, and by the courtesy of the General Manager of the Bournemouth Gas and Water Company, a party of 35 members visited the new gasworks at Pitwines, Poole, on September 22.

Members were conducted round in four separate parties, so that the various stages of gas manufacture, taken in sequence, could be clearly seen.

The arrangements for the intake of coal at the old gasworks were first inspected. The colliers which come alongside the quay carry about 1,000 tons of North Country coal from Durham and Yorkshire. This is removed from the steamer by means of a " grab " which lifts out three tons at each hoist. The coal is transferred by overhead mechanism to the storage yard capable of holding 20,000 tons. The coal is removed as required from the storage yard by the grab at the rate of 250 to 400 tons daily, and it is then passed on to the bunkers over the retort houses, being crushed by machinery to a graded size on the way.

In case the long and somewhat complicated mechanism for the transport of the coal to the Pitwines retort house should temporarily fail, there is a second storage yard near that house capable of receiving 15,000 tons.

The visitors were then conducted to the adjoining new gasworks at Pitwines. These works are entirely up-to-date. Everywhere labour-saving mechanism was in evidence, electric motor power and automatic appliances.

It should be stated, however, that a variable amount of the gas produced, usually about one-third, is still supplied by the old works; also that owing to insufficient depth of water for the colliers to go alongside the new retort house the coal must continue to be hoisted in at the old works.

The retort house contains a series of 24 retorts in two rows. Each retort is fed from overhead, the graded coal falling into the vertical fireclay retorts, which are about 25 feet deep. The retorts themselves are heated by coke furnaces at a temperature of 2400deg. fah. The coke resulting from the heating of the coal is removed from the bottom of the retorts by automatic revolving " extractors." The gaseous products from the retorts are led down to the condensers, tarry and ammoniacal liquors being removed and falling into the tar-well below. These tarry by-products either go to the tar distillers or, as is usually the case,

after a dehydrating process carried out at the works, they are used by the local municipal authorities for road-surfacing, etc.

The ammoniacal liquors, containing the carbonate and sulphide of ammonia, as well as ammonia in solution, are conducted to a large house, where, being distilled into dilute sulphuric acid, the ammonia is converted into ammonium sulphate. Many sacks of this valuable fertiliser were seen stored in the building.

It should be noted that up to this point the gas is drawn through the system of pipes by " exhaust," so that there is a partial vacuum extending to the retorts. This machinery serves to drive the gas under pressure through the remaining plant and into the gasholders.

In the water-gas house the water-gas, which consists mainly of carbon monoxide and hydrogen, is generated by the action of steam on incandescent coke, petroleum oil gas being also added to give the required calorific power in the gas supplied to the consumer. This mixture of gases is added to the coal-gas to the extent of about 30 per cent.

The next building visited was the house for the removal of sulphuretted hydrogen and other sulphur impurities. This is effected by passing the gas through granular oxide of iron; this oxide is continually used till it has absorbed about 50 per cent. of sulphur, when it ceases to be efficient, and is only of service to the sulphuric acid manufacturers.

The chief constituents of gas as supplied to the consumer are, in order of percentage: Hydrogen, methane (marsh gas), carbon monoxide, ethylene series (oil gases), also a small proportion of carbonic acid, nitrogen and oxygen.

Finally, the large new gasholder (formerly known as a " gasometer ") was seen. This contains $2\frac{1}{2}$ million cubic feet of gas. It was understood that a new " holder " is in course of construction at the Bourne Valley Works to contain 5 million cubic feet. This will provide greater storage capacity to meet emergencies.

New plant is now under construction at Pitwines and should be completed in a few months. This is designed to effect the removal of all water vapour from the gas and also of any naphthalene formed, both of which are now a source of trouble to the company as well as to the consumer.

Waterworks. Led by Mr. Claude Lyon, and by the further courtesy of the General Manager of the Bournemouth Gas and Water Company, on October 4th some thirty members of the Society inspected the arrangements for the supply of water to this district.

The party proceeded by charabancs to the Longham pumping station. There they were met by the Chief Assistant to the Company and conducted round in three separate groups.

It should be stated that the waterworks comprise not only the pumping station at Longham, but also the storage reservoirs

and filter-beds at Alderney, as well as a second pumping station at Walsford Bridge near Wimborne. At Longham the water is drawn from the gravel strata beneath the river Stour; whereas at Walsford Bridge it is taken straight from the chalk which holds water flowing from the Dorset uplands.

Longham pumping station is situate alongside the river Stour, at the site of the old flour mills. The water of the river, which percolates through the gravel strata beneath, is tapped at about 25 feet below the surface of the soil: it is led by culverts to the collecting well, whence the water is syphoned to the pumping " sump " (or well). It is now forced by turbines through rapid filtering plant at pressure of about 90lbs. to the square inch, and conducted by two main pipes, 20in. and 18in., direct to the Alderney crude-storage reservoirs.

This rapid-filtering plant is known as " Patersons' pressure filters "; by this process the water is forced through cylinders containing coarse, gritty sand, which removes the bulk of suspended matter. To keep the sand clean, the flow of water can be stopped and the mechanism reversed, so as to force clean filtered water back through the sand in the cylinders; the sand itself is at the same time churned up by air pressure.

Before it is pumped up to the storage reservoir at Alderney the water undergoes the following chemical treatment:—To increase the filtration efficiency of the high-pressure cylinders, sulphate of alumina is passed into the pump sump; this precipitates a considerable amount of suspended matter from the water before it is conducted into the cylinders. Chlorine gas under pressure is pumped into the filtered water to the extent of about one half part per million; this destroys any bacterial matter that may be present. At Alderney, sulphur dioxide is passed into the water to eliminate any free chlorine that may remain.

To pump the water up to the storage reservoir at Alderney there are two Worthington pumps, three water turbines, and two steam turbines; these can deliver a total of about 10 million gallons daily.

The party then proceeded to Alderney where are situate the storage reservoirs and sand filter beds, at level of 210 feet above ordnance datum. The new three million gallon covered reservoir was inspected. This is 24 feet deep and is almost entirely above ground level. Over this reservoir are three sand and gravel filter-beds, with filtering capacity of two million gallons daily; the sand, obtained locally, is cleansed every month.

Some three hundred yards away could be seen three storage reservoirs with additional sand-gravel filters: one containing five million gallons receives the rough-filtered water from Longham; two smaller reservoirs of three million and one million gallon capacity respectively, receive the filtered water from Longham and Wimborne. From Alderney the water flows into Bournemouth by gravitation through one 20-inch and two 18-inch diam.

trunk mains. The 18-inch pipes supply the Boscombe area, whilst the 20-inch pipe is led to the Bourne Valley station for distribution by centrifugal pumps to western Bournemouth.

Lastly the laboratory was seen. Here are carried out the important analytical tests and checks as regards purity and degree of hardness.

Insufficient time remained to complete the tour of the works, but this report would be incomplete without further reference to the Walsford Bridge pumping station, more especially important as the water obtained from the chalk is absolutely pure at its source, and has been supplied since 1902. The well tapping the chalk was sunk close to the river Allen, a tributary to the Stour. The chalk is reached at about 100 feet, but the well itself (which is 10 feet in diameter) is continued to the depth of 21 feet, beyond which a 6-inch boring taps an additional 50 feet. The water is pumped up to the surface, where, owing to hardness due to chalk in solution, it is softened in a softening plant on the Haines system. The water passes into a "softening tank" of 60,000 gallons capacity; here it is continuously mixed with milk of lime (obtained from freshly burnt limestone) which is pumped into the tank from three "liming cylinders," each of which is fed daily by 6 cwt. of the lime. The water is then led into eight vertical filters where it passes through cotton cloths; these retain the chalk which has been precipitated in the softening tank. Hence the water flows away perfectly clear and bright. At intervals, automatic spraying gear traverses the surface of the filter plates and washes off the chalk. The water thus treated passes into a large tank below the liming cylinders, whence it is forced by the high-lift pumps, at rate of $1\frac{1}{2}$ million gallons daily, to the closed reservoir at Alderney.

Congress of the South-Eastern Union of Scientific Societies at Hastings.

Report of Delegate from the B.N.S.S.

The success of the Congress was assured by the admirable organisation of the Hastings Scientific Society and by the cordial support of the civic authorities, who placed at the disposal of the Congress the Masonic Hall and the Museum, so rich in specimens of marine fauna. A brilliant feature was the mayoral reception, followed by a concert, in the New Pavilion.

A tour of the old town embraced the 13th century churches of S. Clement's and All Saints, on either side of the river Bourne, whose combined revenues were granted by Edward the Confessor

to the Abbey of Fécamp. The latter church cherishes a facsimile letter of Titus Oates, whose father was for a time Rector of the Parish, and near by is the half-timbered house which was the early home of Sir Clowdisley Shovel, the hero of Gibraltar.

Thence we passed to the Sandstone Caves, said to be 3 acres in extent, variously described as a refuge for the early Christians, the haunt of smugglers, and a quarry for sand exported for the manufacture of glass. Finally we visited the picturesque ruins of Hastings Castle, perched on the cliff above the town, and containing a chapel with Gothic chancel arch. It occupies the site of the wooden stronghold which figures in the Bayeux tapestry, erected by the Conqueror after his landing at Pevensey. Once numbered among the Cinque Ports, Pevensey is now a peaceful village, separated from the sea by a long stretch of green pasture. Its ancient castle is of surpassing interest, as it really comprises the remains of three fortresses one within the other. First we have the whole enclosure, some 10 acres, of the Roman Fort of the Saxon Shore, with high walls and towers of characteristic brick and stone work. Inside this at the East end is the Norman Castle, partly surrounded by a moat and built by Peter of Savoy in the 13th century, while inside that again is the ruin of the original Norman Keep, built by Robert de Mortain, the half-brother of the Conqueror. This keep occupies the highest part of the enclosure and its water-gate led to the channel by which access to the sea was maintained. The castle is now in the keeping of the Office of Works.

Another excursion was made under the guidance of Mr. P. H. Johnston, F.S.A., to Battle Abbey, the Conqueror's tribute to victory, and to Bodiam Castle, lately bequeathed to the nation by Lord Curzon, and the most perfect example in the country of a mediæval moated castle. It was built in 1385 by Sir Edward Dallingridge at the command of Richard II., to guard the upper part of the Rother Valley. It is dominated by neighbouring hills, but in early times, before the use of cannon, with its stout Barbican and portcullis and its moat and drawbridges, and strengthened by an octagonal outwork, it must have been well-nigh impregnable.

Another excursion to Rye and Winchelsea combined opportunities for archæologists and for geologists. Both towns are packed with interesting remains of antiquity. Once flourishing ports, they are now cut off from the sea by two miles of rich pasture land and banks of shingle, the effect of Channel tides and fluviatile deposits of the Rother and Brede.

The Presidential Address on "The Flora of Sussex, Past and Present," was delivered by Dr. Rendle, F.R.S., Keeper of Botany in the British Museum. The paper, illustrated by slides, was principally devoted to a description of the fossil flora of the Wealden Strata—the cycads and tree-ferns. Specimens of these are found in the "petrified forest" at Lulworth Cove, and in

the Great Palm House at Kew these extraordinary reproductive organisms may be studied to advantage.

The President of the Zoological Section, Professor MacBride, F.R.S., took as his subject "The Origin and Nature of Mutations," and dwelt on the effects of environment, artificial selection, and breeding as contrasted with natural selection. The horse has been evolved from his three-toed ancestor by natural selection; but by artificial means special varieties of vertebrates have been produced which breed true with due attention to choice of parent stocks, but which speedily revert to type without such precautions.

There followed a paper by Mr. Thorpe, of the Cambridge Zoological Laboratory on the Fauna of the brackish pools of the Sussex coast, and the effects of the various degrees of salinity on life in such pools.

Not the least interesting of the meetings was a cinematograph display, primarily for the benefit of school children, but no less thrilling to adults, exhibiting "Some Secrets of Nature," and illustrating the life history of the cabbage butterfly, the Mayfly, the stickleback, as well as the circulation of blood in the tail of the tadpole, and the beating of the heart of a water flea. This was a splendid demonstration of the potential value of the cinema as a means of instruction and as a stimulus to the study of natural history.

J. R. Dodd.

Report of the Delegate of the Bournemouth Natural Science Society to the Meeting of the British Association at Leeds, September, 1927

The Presidential Address, delivered by Sir Francis Ogilvie, C.B., formed a sequel to a former address on Regional Surveys, and dealt chiefly with Vegetation Surveys. There followed a Paper by Sir George Fordham on "The Protection of Wild Flowers"; the ensuing discussion involved the question of preservation of objects of interest, such as the Agglestone, by local authorities. Papers were read on "Preserves" in Yorkshire and Norfolk. In both these counties certain areas have been set apart as sanctuaries, especially for rare birds. Considerable success has already attended these efforts, and many landlords have supported the movement in a practical way. What we want, said Professor Oliver, is the formation of County Associations to co-operate with local Natural History Societies in securing considerable areas, say four or five miles long, for this purpose. It is wonderful how quickly local people become interested and join such Associations. A magazine, perhaps on

the lines of "Country Life," would stimulate public interest in the matter. Referring to the anti-mosquito campaign, a delegate expressed the fear that the oil-spraying treatment might ultimately destroy all forms of pond life, and implied that, as a rule, mosquitos in England are not harmful. To this your delegate took exception, with reference to the very successful Institute at Hayling Island.

Next year the Association will hold its meeting in Glasgow.

CLAUDE LYON.

Archaeological Note

A Late Bronze Age Urn-field at Pokesdown.

Recent development, in November 1926, of the Iford Estate, involving the construction of roads on the North side of Pokesdown Hill, has led to the discovery of a number of interesting Cinerary Urns, mostly of the globular type, on land which had been long in the hands of allotment holders. Fortunately, the matter soon came to the knowledge of the Society through the energetic action of Col. E. B. Anderson, C.B.E., and steps were at once taken by the Society to examine the site and to safeguard the specimens already unearthed. It was soon apparent that the necessary excavations were beyond the scope of the Society, and the matter was accordingly reported to the Society of Antiquaries, with the result that a thorough examination of the site was carried out. A full account may be found in Vol. VII., No. 4 (October 1927) of "The Antiquaries Journal," a copy of which is now in our Library.

Report of the Botanical Section.

The Botanical Section held 37 meetings, comprising 5 Lectures at 3 p.m., 5 Informal Meetings at 5 p.m., 23 Excursions, 3 unofficial Excursions, and one Garden Party.

The Lectures were well attended, while the Informal Meetings continued to maintain their interesting character.

The Excursions were more numerous than usual and were well patronised—the average attendance being higher than in any previous year. In spite of the wet summer, one excursion only was marred by rain.

On June 21st, a very successful Garden Party was held at No. 39, which was attended by more than 80 members and

friends. Specimens of wild and garden flowers sent by Mr. R. V. Sherring, Mr. Lamb (Oxford), Mr. Maurice Prichard and others were exhibited, also specimens of flowering shrubs from the Rev. C. O. S. Hatton's garden, and a collection of water-colour drawings of fungi and wild flowers by Mr. H. H. Steeple. The plants in the Economic Garden were described by Dr. J. B. Hurry, and an orchestra under the direction of Mr. G. Brumell gave selections during the afternoon. Tea was served by a Committee of Lady Members.

The following are some of the more interesting plants observed during 1927 :—

Ranunculus Lingua, *L.*
Aquilegia vulgaris, *L.* (new station).
Lepidium perforatum.
Pulicaria vulgaris, *Gaertn.*
Galinsoga parviflora, *Cav.*
Lactuca virosa, *L.*
Lobelia urens, *L.* In Dorset. First recorded for this station in 1920.
Erica cinerea, *L.* An interesting form in which the flowers are replaced by compact heads of red bracts, (G.G.B.).
Centunculus minimus, *L.*
Stachys annua, *L.*
Amaranthus retroflexus, *L.*
Cladium Mariscus, *Br.*

Plant Galls of Hampshire and Dorset.

By L. Beeching Hall, F.L.S.

During the past three years I have found a considerable number of Plant Galls in Hampshire and Dorset. With a view of making the records as complete as possible, members are invited to send any specimens they may find in these counties, with sufficient of the host plant to allow accurate identification, and full details of locality. The following are among the more interesting already found. The names of the plants are as in the London Catalogue, eleventh edition. The Hampshire records are marked (H), the Dorset (D).

On Thalictrum flavum (Meadow Rue)—fruits swollen, containing yellowish white larvæ of the fly Clinodiplosis thalictricola *Rübs.* Hurn (H).

On Helianthemum chamæcistus (Rock Rose)—stem terminating in a head of deformed leaves containing orange larvæ of the fly Contarinia helianthemi, *Hardy.* Studland (D).

On Lychnis dioica (Red Campion)—Flower buds swollen; flower not developed, containing yellowish or white larvæ of the fly Contarinia Steini, *Karsch.* East Lulworth (D).

On Rhamnus catharticus (Buckthorn). On the lower surface of the leaf, patches of very short, dense, felt-like hairs, among which live the mites Eriophyes annulatus, *Nal.* Brockenhurst (H).

On Genista tinctoria (Dyer's Greenweed). Stems terminating in heads formed of swollen folded leaves, containing a colony of larvæ, at first white but becoming pink towards maturity, of the fly Perrisia genisticola, *F. Löw.* New Milton (H).

On Ulex Gallii (Western Furze). Flower buds somewhat swollen, remaining closed, covered with whitish hairs, containing the solitary larva of the fly Asphondylia ulicis, *Verrall.* Parkstone (D).

On Ulex Gallii. Ovoid swelling on the stem, about the size of a pea, containing a single larva of the weevil Apion scutellare, *Kirby.* Parkstone (D).

On Lotus uliginosus (Marsh Bird's Foot Trefoil). Flowers swollen, remaining closed, usually marked with red streaks; containing the larvæ of the fly Contarinia loti, *De Geer.* Nr. Hamworthy (D).

On Prunus spinosa (Blackthorn). On the upper surface of the leaf, small round or oval bosses, often coloured red, covered with short hairs; with an opening on the under side of the leaf the entrance to which is guarded by a barrier of fine hairs. The galls are inhabited by the mites Eriophyes padi, *Nal.* Nr. Wareham (D). Nr. Brockenhurst (H).

On Daucus carota (Wild Carrot). Fruit enlarged, often raised above the level of the umbel, frequently reddish or violet, containing the yellow larva of the fly Schizomyia pimpinellæ, *F. Löw.* Nr. Wool (D).

On Viburnum Lantana (Mealy Guelder Rose). Flower buds enlarged, not opening, containing the gregarious yellow larvæ of the fly Contarinia lonicerearum, *F. Löw.* Nr. Blandford (D).

On the same species a gall similar to the foregoing, but containing the white larvæ of the fly Contarinia viburni, *Kieff.* Nr. Witchampton (D).

On Achillea millefolium (Milfoil). On the stem, leaves or flowers, small oval galls, about the size of a barley grain, at first green, then changing to reddish brown or black; opening at the top by recurved lobes. Each gall contains a single yellow larva of the fly Rhopalomyia millefolii, *H. Löw.* Moreton (D).

On Hypochaeris radicata (Long-rooted Cat's-ear). Stem conspicuously swollen, the enlarged part elongate, usually tapered, but occasionally rounded at the ends; containing numerous cells, each with a yellowish larva of the gall wasp Aulax hypochaeridis, *Kieff.* Parkstone (D). Nr. Christchurch (H).

On Echium vulgare (Viper's Bugloss). Flower head replaced by an irregular compact mass of small green distorted leaves, among which live the mites Eriophyes echii, *Can.* East Lulworth (D).

On Convolvulus arvensis (Small Bindweed). Leaf twisted, swollen, tightly rolled towards the upper side, forming an irregular red pouch, in which live the mites Eriophyes convolvuli, *Nal.* Nr. Swanage (D .

On Pedicularis sylvatica (Red Rattle). Edge of leaf recurved, red; lower surface with short felt-like hairs; caused by the mite Phyllocoptes Pedicularis, *Nal.* Marlboro Deep, New Forest (H).

On Origanum vulgare (Marjoram). Inflorescence transformed into a mass of contorted leaves covered with white hairs. Caused by the mites Eriophyes origani, *Nal.* Nr. Corfe (D).

On Corylus Avellana (Hazel). Catkin swollen, usually somewhat pear-shaped, with the scales larger and smoother than normal; containing a colony of the white larvæ of the fly Stictodiplosis corylina, *F. Löw.* Studland (D).

Report of the Entomological Section.

At the annual general meeting held on October 16th, 1926, Mr. Howard Lacey, B.A., was unanimously elected Chairman of the Section in succession to Mr. Joseph Neale, B.A., who, owing to weak health, was unable to continue the work which he had so ably discharged since his election to the chairmanship in January, 1920.

Mr. Neale's death, which occurred in June, 1927, was felt to be a great loss, not only to the Society as a whole but particularly to the members of the Entomological Section.

Meetings were held during the winter session and short lectures and " Informal Talks " on various interesting subjects were given by the Chairman, by Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S., and by Mr. S. Whitaker. Discussions of the subjects, after the lectures, were invited and in these Mr. L. Beeching

Hall, F.L.S., Surg.-Capt. Borrett, R.N., and others took part. By the kindness of Mr. F. B. Taylor, B.A., and other members of the Microscopical Section, many of the subjects were further studied with the help of the microscopes.

By arrangement with the Botanical Section the entomologists joined with them for the summer excursions.

Geological Note.

Early in the year a fine-grained sarsen stone weighing nearly a ton was found in the plateau gravel at Moordown. It was probably derived from the local Bagshot sands, and there is no reason to believe that it has been transported far. Later in the year it was removed to the grounds of the Russell-Cotes Museum, where it can now be seen, but it is not in its original attitude.

Library Report.

Several useful and interesting books and pamphlets on various subjects have been added to the Library since the last Report appeared.

The shelves have been renumbered and many of the volumes have been rearranged. In this rearrangement the aim has been, as far as possible, to place the volumes which appear to be in most demand in the most accessible position, care having at the same time been taken to keep them as far as is practicable in their proper grouping. This, it is hoped, will increase the usefulness and popularity of the Library.

The exchange of our Proceedings with the Proceedings or Reports of other Societies has been continued and several valuable volumes have thus been added to those already received.

The new Catalogue, referred to in the last Report, has now been completed and will be found on the Library table.

The following is a list of the donors of books :—

Mr. Henry Backhouse, F.R.H.S.
Mr. Henry Bury, M.A., F.L.S., F.G.S.
Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S.
Mrs. Crallan.
Mr. W. Edgar.
Mr. F. W. Longbottom, F.R.A.S.
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Mr. W. Munn Rankin, M.Sc., B.Sc.
Mr. R. V. Sherring, F.L.S.

Rev. E. J. Douglas Simpson, M.A.
Mr. F. B. Taylor, B.A.
Rev. A. G. Yates, M.A., R.N.

The Hon. Librarian desires to express the thanks of the Society to the donors.

The following works were purchased :—

The Surface History of the Earth, by J. Joly.
The Physiology of the Continuity of Life, by D. Noel Paton.
Rhododendrons for Everyone, by F. K. Ward.
Tales of Ancient Wessex.
The Australian Aboriginal, by H. Basedow.
British Birds : III. Series, by T. A. Coward.
Words and Places, by Isaac Taylor.
Prehistoric Man, by K. Henderson.
Highways and Byways of Hampshire, by D. H. Read.
Infusoria, by A. Pritchard.
The Life of the Plant, by Sir F. Keeble.

and the following Quarterlies :—

Antiquity, and The British Museum Quarterly.

Museum Report.

The general arrangement of the Museum is progressing slowly; but we are still hampered by the lack of cabinets suitable for exhibiting specimens. Mr. Lacey has now finished the egg collection and the two cabinets make a very useful and interesting exhibit. The assistance of experts willing to classify and arrange the Society's collection, in several sections, is urgently needed, especially with regard to the flint implements, the leaf impressions from the Bournemouth Beds and the geological specimens generally. There have not been many additions of local interest during the year. We had hoped that we might have obtained the urns which were excavated on the burial ground at Pokesdown; there was, however, a difficulty owing to our Museum not being open to the public, and they have now been deposited in the British Museum. We have received from Dr. Clay a very nice collection of flints which were found during the same excavations, and Colonel E. B. Anderson has presented a well-preserved palstave found in Talbot Woods.

Presidential Address.

SATURDAY, OCTOBER 22nd, 1927.

Archæological Benefactors of Hampshire, Dorset and Wiltshire.

By Heywood Sumner, F.S.A,

There is a fine tradition preserved by old institutions of commemorating their respective benefactors on what is called "Founders' Day," when a roll of worthy names is recited in stately Bidding Prayers, giving thanks for the benefits bestowed by such Founders.

Now there are Founders of Knowledge, as well as Founders of Institutions. Pioneers of research. Men who have pointed towards the direction of discovery that others have been enabled to follow up. Each section of our many-sided Natural Science Society will have its own roll of names worthy of remembrance, but of such I am only qualified to speak of one—namely, the Archæological side of the Archæological and Historical Section.

I have been specially concerned with the survey and excavation of local ancient sites, and, in so doing, have been constantly indebted to the records of bygone workers in the same field of enquiry. Some of these have handed down invaluable surveys —such as Sir Richard Colt Hoare; or pre-eminent records of excavations—such as General Pitt-Rivers, and the excavators of Silchester. There is no fear of these classics being forgotten. But others there are who have helped forward local archæological knowledge in lesser, yet in very real degree, whose names and work we may be apt to forget, but ought to remember. Thus, I wish to revive remembrance of our past benefactors in pursuit and in record, and my following address will be in *praise of famous men and our fathers that begat us*—us, members of the Archæological and Historical Section of the Bournemouth Natural Science Society.

A chariot of fire was once the symbol for a prophet's transit from earth to heaven. It is now a transport fact of common locomotion, which has greatly extended the field of archæological enquiry around any given centre. Here, at Bournemouth, our enquiry now ranges far and wide, within the three counties adjoining, namely, Hampshire, Dorset, and Wiltshire; and it is within such area that I shall seek to revive the memory of our local archæological forefathers, who "well and truly" laid foundations (and in some instances raised substantial walls), on which we, their inheritors, may strive to build.

HAMPSHIRE.

Comparisons are proverbially odious, and it is not my purpose to compare, but to commemorate our archæological benefactors in three counties. The order in which I shall take them is *not* as in order of merit, but of topography. We are a Hampshire Society, with Dorset near by, and Wiltshire farther afield, accordingly such topographical facts have imposed the order of my review, and I begin with Hampshire.

Dr. Stukely in his "Itinerarium Curiosum" (1776) has some references to Hampshire, but the work for which he is specially remembered concerns Stonehenge and Avebury, and will be described later on. The enquiries of his "Itinerarium Curiosum" through our three counties were apportioned thus—Hampshire, few—Dorset, more—Wiltshire, most. He takes his place as an archæological benefactor of Wiltshire more truly than of either Hampshire or Dorset.

Now I must confess to an irresistible impulse to place the honoured name of Gilbert White, of Selborne, at the head of my Hampshire list of those who have forwarded local archæological knowledge; and I fear that members of our Natural History Sections, may hastily accuse me of stealing.

Last year, a lady was charged at the Central Criminal Court in London for stealing a dressing-case with jewellery. Her defence was, that, in the words of her doctor, "she was a person "with a morbid desire to acquire other people's property under "an irresistible impulse." The Common Serjeant, however, in passing sentence, brushed aside such euphemism, and convicted the lady of common stealing.

But, before our Natural History members pass judgment on me (the lady got six months), I ask them to refer to the title of Gilbert White's classic book, published in 1789—"*The Natural History and Antiquities of Selborne*"—and to Letter I. in "The Antiquities of Selborne," wherein he tells the tale of a large find of Roman copper coins, and of some "medallions of "a paler colour than the coins," on the floor of "Wolmer Pond"—which pond had dried up owing to drought in 1741. "Of those that we saw," says Gilbert White, "the greater part were of *Marcus Aurelius,* and the Empress *Faustina,* his wife."

Subsequent discoveries, as will be seen, showed that Gilbert White's solitary letter on prehistorical Selborne, was a pointer to further discoveries belonging to a later period of the Roman occupation. Thus, I plead justification, and trust that I may be discharged with no stain on my character!

The find recorded as above is of interest, because about the year 1774 a large pot of Roman "medals was found in "Wulmere Pond" (recorded in a letter from *William Sewell to*

Gilbert White 1777, Vol. II. Appendix in Thos. Bell's edition of White's Selborne, 1877). While in 1873, "half-way between "Blackmoor House and Woolmer Pond" (yet another variant spelling of this pond place-name) an immense hoard of Roman coins was found in two large pots. 29,786 coins were catalogued, dating from A.D. 238, to A.D. 298. The first Lord Selborne (who had then recently acquired this property) contributed to Thomas Bell's edition of White's Selborne, mentioned above, a full account of this remarkable hoard, with conjectures as to its having formed part of the army-chest of Allectus. Professor Haverfield in his article on Romano-British Hampshire in the *Victoria History of Hants*, Vol. I., referring to Lord Selborne's conjectures, says, "the theory has a certain geographical plausi- "bility. The troops of Chlorus appear to have landed on, or "near the coast of Hampshire, and their victory over Allectus "A.D. 296-297, may have taken place within the area of our "county."

"*Camden's Britannia with Additions by Richard Gough,*" published by John Nichols, London, demy folio, 3 vols. 1789, contains (specially in the Additions) most valuable observation of ancient sites throughout Hampshire, Dorset, and Wiltshire, with plates showing plans of earthworks, of Stonehenge, figures of objects found, Roman inscriptions, etc., and good maps of the three counties by J. Cary, in which the sites of the principal ancient camps, etc., are shown.

It may be noted that *Isaac Taylor's Maps of Hampshire,* scale 1 inch to 1 mile, published in 1755, *and of Dorset,* same scale, published in 1765, were the first to record earthworks cartographically on such scale.

We owe little to Richard Warner for his archæological activities around Lymington at the end of the 18th century; but his local historical benefactions may be noted with respect—though outside my subject.

Sir Henry Englefield in the second edition of "*A Walk through Southampton,*" published by Baker and Fletcher, Southampton, quarto, 1805, gives "some account of the Roman Station, Clausentum." (Bitterne). Abundant Roman remains were found here, with an altar inscribed to Ancasta, and several inscribed milestones. The coins found cover the whole imperial period to A.D. 380.

"*Sketches of Hampshire*" by Henry Duthy, published by Jacob and Johnson, Winchester, royal 8vo, 1839, contains record of the Bramdean villa—a rich man's villa—that was excavated by William Greenwood of Brookwood Park in 1823. It is illustrated by two plates, that include a scanty plan, and good coloured engravings of two very fine mosaic floors that were discovered. The coins found range from A.D. 53 to A.D. 337. After excavation this villa was preserved for many years by a

substantial shed that the excavator erected, roofing over the mosaic floors. But Time, mischance, and the seasons' waste, eventually destroyed this well-intentioned attempt to preserve the remains of a high-class Roman villa. I can remember seeing it when I was a boy in the late sixties; then, it was in the last stages of decay, but I can only recall dereliction, and a dim memory of patterned floors in ruin.

In 1853, the Rev. J. P. Bartlett excavated New Forest pottery sites at Crock Hill and Island's Thorns, and recorded the same in *Archæologia*, vol. XXXV. J. R. Wise made further excavations in such sites, circa 1860, at Sloden, Crock Hill and Pitt's Wood—which were described in his book, *"The New Forest,"* published by Smith and Elder, London, sm. quarto, 1863. Neither of the above excavators discovered the distinctive plan of a New Forest pottery kiln. J. R. Wise also did some barrow hole-digging in New Forest, which are also recorded in the above-named book, but alas, he did not learn (as he ought to have learnt) from Richard Warner's bad example on Sway Common and Setley Plain, to show his respect for prehistoric memorials, by filling in his hole-diggings, and restoring the barrows to their previous profile.

"A Parochial History of St. Mary Bourne. With an account of Hurstbourne Priors," by Dr. Joseph Stevens, published by Whiting and Co., London, 1888, Imp. 8vo., is an admirable example of what a Parochial History should be. It is the work of an archæological and learned old inhabitant, recording the physical aspects, the pre-history, and the history of his district in a living manner. It is delightful to read, well illustrated (excepting map omission), a mine of local information, and documents, and is of wide scope in range of observation. A local book to possess.

Now, in my review of our Hampshire Archæological benefactors I arrive at a site, the persistent excavation of which has been Hampshire's greatest archæological contribution to knowledge. Indeed, the complete excavation of the Romano-British town of Silchester, *Calleva Attrebatum* of the Antonine Itineraries, on the Northern boundary of Hampshire, initiated by the Rev. J. C. Joyce, *1. and carried on and completed by the Society of Antiquaries, is a model example of systematic excavation, scientific record, and, eventually, of admirable display and arrangement of the relics found, in the Reading Public Museum.

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* 1. The Rev. J. C. Joyce, in addition to his qualifications as a learned excavator, had artistic ability to record his finds as well by pencil as by pen. His notebooks (which I have been privileged to see) were illustrated throughout with plans, and objects, sketched in outline, and coloured, imparting in such autograph presentment, the authentic joy of original discovery.

There is an excellent *Guide to the Silchester Collection* by George E. Fox, revised by Mill Stevenson, from which I take the following short account of this excavation :

" Some little digging was undertaken here during the " eighteenth century, but the real commencement of the work " of exploring the site began only in 1864. In that year the " Rev. J. C. Joyce, rector of Strathfieldsaye, submitted to the " then Duke of Wellington, on whose estate the site lay, a " proposal to excavate certain portions of it. This the Duke " readily consented to, and from 1864 to 1878, the year of Mr. " Joyce's death, the work was carried on from time to time. " Some houses, the *basilica* and *forum*, and the circular temple, " as well as the east, north and south gates were uncovered." (See *Archæologia,* XL. and XLVI. for detailed accounts of the above). " After Mr. Joyce's death the work was continued for " a time by the rectors of Strathfieldsaye and Silchester, and " Mr. Hilton Price, the late director of the Society of " Antiquaries. An interval of five years then elapsed, when in " 1889 an earnest representation was made by G. E. Fox and " W. H. St. John Hope to the Society of Antiquaries as to a " continuance of the excavations at Silchester. The application " was cordially welcomed by the Society, and permission for the " work being willingly given by the late Duke of Wellington, a " small committee of management was formed and the explora- " tions were resumed. From 1890, year by year, the excavations " have been continued without intermission and the whole of " the site has now been explored. It was soon found that the " results of the diggings accumulated largely and it was necessary " to take some steps for their storage and exhibition. At this " juncture the municipality of Reading came forward with an " offer of finding room for them in their museum. The offer was " accepted by the Duke of Wellington, who decided to place in " that museum all the objects found, as a permanent loan."

Professor Haverfield in his article on " The Romano-British " Town of *Calleva Attrebatum* at Silchester," Vol. I. *Victoria History of Hampshire,* thus describes the site and method of excavation, pp. 352, 353 :

" Under the scheme of operations adopted, each of the " squares or *insulæ* into which the area of the town is divided by " the Roman roadways was to be thoroughly examined by " trenching, and all foundations of buildings carefully explored " After being properly planned, etc., the foundations were again " to be covered up, and the land restored to cultivation . . . .

" The first fact noticeable on looking at a plan of the town " is its peculiar form, which is that of an irregular nonagon, " with its longest side towards the north-east. This irregularity, " so unlike the rectangular plans of *Glevum* (Gloucester), " *Camolodunum* (Colchester), or *Lindum* (Lincoln), it shares with

" the still larger towns of *Uriconium* (Wroxeter), and *Verulamium* " (St. Albans), and probably with some other exceptions to the " general rule. This leads to the supposition that the Roman " surveyors laid out the lines of *Calleva* within the mounds of a " Celtic *oppidum* which they found on this spot, perhaps the " chief stronghold of the Atrebates. This idea receives confirma- " tion from the fact that a mound, with a ditch on its outer face, " remains at no great distance from the town wall on the north, " the west, and partly on the south side.

" The Celtic earthwork occupied the eastern end of a tongue " of ground which here projects from the high land to the west " and north. The site was a commanding one, gently sloping " southwards, and possessing the double qualification of a wide " outlook and of a position easy of defence and difficult of " attack.

" Within the site thus described there is reason to believe " that a settlement gradually grew up early in the Roman " occupation about the ancient Celtic roads which here inter- " sected. This settlement must soon have become an important " one, and at an early period, perhaps during the second half " of the second century, the *forum,* with the adjoining *basilica,* " began to be built in the centre of the town at the intersection " of the roads that traversed it from east to west and north " to south."

The coins found cover the whole period of the Roman occupation of Britain—while the discovery of pre-Roman coins of the British ruler Epillus, Rex Calle (vae), show that it was a Celtic tribal centre before it became a Roman town. Its end is unknown, but its excavators declare that it was not burnt.

The Silchester excavations conducted by the Society of Antiquaries, and recorded in *Archæologia,* LII., LIII., LIV., LV., LVI., were actively supervised by George E. Fox, W. H. St. John Hope, and Mill Stevenson, whose names, together with that of the initiator, the Rev. J. C. Joyce, should always be held in grateful remembrance for a great work achieved.

Again I quote from Professor Haverfield's article in the *Victoria History,* Vol. I. :

" By the side of Silchester we have to see another Roman " country-town, Winchester, *Venta Belgarum.* In Roman days " the two places were probably very much alike. To-day they " stand in sharp contrast, the one a vast open space ringed with " an ancient wall, the shadow of a vanished world; the other " a crowded labyrinth of lanes and streets and churches, filled " with memories of the nearer past and with busy modern life. . . " No man has dwelt on the site of Silchester since its Romano- " British population left it. Winchester has been continuously " inhabited for thirteen centuries and possibly since Roman

" days. *Venta Belgarum* lies buried deep beneath the dust and " débris of those many years; the floors of her houses are some- " times twelve feet underground; her features are dim and hard " to discern."

Considerable Roman remains were found when the London and South Western Railway was made in 1838, which aroused the interest and sharpened the subsequent outlook of local antiquaries for the discovery of Roman buildings and relics, amongst whom W. H. Jacob, W. H. Bradfield, T. Stopher, and H. Moody should specially be held in remembrance in this respect. Throughout Victorian years they were magnets that attracted information as to Roman finds in Winchester, and their records enabled Professor Haverfield to describe and map the Roman town of *Venta Belgarum* in his said article on " Romano-British Hampshire." Many of these relics may be seen in the Winchester Museum.

T. W. Shore, the secretary of the Hartley Institute, Southampton, was the originator of the Hampshire Field Club and Archæological Society in 1885. He was then elected as organising secretary and continued his active service in such capacity until 1896 when he left Southampton. During this period he contributed many informing papers to " The Proceedings " of this Society on archæological, antiquarian and geological subjects throughout Hampshire. After his death in 1905, the *" Shore Memorial Volume, Hampshire Papers of the Natural History and Antiquities of the County,"* was published by H. M. Gilbert and Son, Southampton, sm. 8vo., which reveals the wide range of his knowledge and interests.

DORSET.

William Augustus Miles was an enthusiastic archæologist, of whom Dr. Wake Smart, of Cranborne, drily remarked : " His " enthusiasm was acknowledged to be contagious, but we rightly " doubted his conjectures." However, we are much indebted to him for *" A Description of the Deverel Barrow.* Opened " A.D. 1824 by William Augustus Miles," published by Nichols and Son, London. Thin Imp. 8vo. 1826. This remarkable barrow yielded what is now regarded as very late Bronze Age— or dawn of Iron Age evidence of much value, namely, 30 interments, of which 21 were burials in urns. The urns were well illustrated by the author, and engraved by James Basire III. (cf note 6, infra). This record also includes " A minute account of the Kimmeridge Coal Money "—An account that is composed of the said " rightly doubted " conjectures; but " Coal money " was more, or less, accepted as such by archæologists until John Sydenham (the historian of Poole) first explained the turning lathe origin of the supposed Kimmeridge " Coal money," at the Archæological congress held at Canterbury in 1844.

During this mid-Victorian period in Dorset there was a considerable amount of archæological activity in the county. The Dorset County Museum was founded in 1845, William Barnes, the beloved Dorset poet, being appointed as one of its Hon. Secretaries, and his name and labours were connected with this Museum for forty years. He was also connected with the preservation of two specially interesting Dorchester earthworks, namely, Poundbury, and Maumbury Rings, when, in 1846, the Great Western Railway planned a cutting right through Poundbury: however, William Barnes and Charles Warne, helped by William Colfox of Bridport, succeeded in getting the Railway Company to change their plan from an open cutting to the tunnel that now runs under the earthwork. In the same year, a similar project threatened Maumbury Rings—the Roman amphitheatre outside Dorchester, and again, the exertions of these three defenders aforesaid preserved this threatened earthwork.

The *Purbeck* Society was formed in November, 1855, and from that date to 1861, it periodically issued small octavo "*Papers,*" printed by C. Groves, Wareham, on antiquarian and natural science subjects. Only a small number of each issue seems to have been printed, judging by the difficulty that now exists to obtain copies of such Papers. The Rev. John H. Austen, rector of Tarrant Keynstone, was the Hon. Secretary of this Society, and its archæological mainstay—as testified by his contributions, namely, "On the Tumuli of St. Aldhelm's Head District" (excavation record), "The Kimmeridge 'Coal Money,'" "The Tumuli of the Chalk Range" (excavation record), and "Roman Pottery discovered in Purbeck."

The other contributors were Oliver W. Farrer, John M. Gresley, J. C. Mansel, Thomas Bond, Rev. L. Lester, N. Bond, and F. F. Tracey.

Besides the Rev. John H. Austen, Charles Warne (then living at Milbourne St. Andrew) was busy barrow digging during this mid-Victorian period. Dr. Wake Smart was applying his acute mind to the Archæological problems of his district, and writing that most informing, local chronicle, "The History of Cranborne." Henry Durden, of Blandford, was collecting all the finds made around Hod Hill—a collection that was eventually purchased by the British Museum, circa 1892. Charles Hall, of Osmington, and later of Ansty, was also a great collector who, according to Charles Warne, was "a most enthusiastic antiquary "—yet, unfortunately, not given to 'taking notes' "; ("Celtic Tumuli of Dorset. Tumuli opened at various periods.") William Shipp of Blandford also was collecting relics, but *was* "taking notes" of local archæological matters, by which he enriched the *Antiquities* so well recorded in that great work—the third edition of "Hutchins' History of Dorset," (1861). John Sydenham was writing the "History of Poole"; identifying the real usage of

Kimmeridge supposed "coal money," as above mentioned; but less usefully employed in theorising on the Cerne Giant in "Baal Durotrigensis." Dr. Wake Smart in his obituary notice of Henry Durden (who died in 1891), *Dorset Field Club Proceedings,* Vol. XIII. 1892, *2. states that the above mentioned Dorset antiquaries used to have occasional meetings to compare notes, read essays, and exhibit specimens of antiquarian interest which they had recently added to their respective collections. He was then the last survivor of this active group of local archæologists, and died at Cranborne circa 1894.

Charles Warne was the principal Victorian contributor to the Archæological Records of Dorset—as follows: "*Illustrated Map of Dorsetshire its vestiges, Celtic, Roman, Saxon and Danish,*" with "*An Index to the Illustrated Map.*" Published by John Camden Hotton, London, and R. Sydenham, Poole, sm. 8vo, 1865. The author in his preface acknowledges the ability which Mr. George Hillier had displayed in "the engraving of the map, "as well as in its construction on a plan so original and unique." The map (which the Index explains) is mounted on linen, encased, ½ inch to 1 mile in scale, and presents a bird's eye view of the County in tones of green, the low-lying land being shown in a darker green than the high land, and the hills contoured on one side with a darker shade; white cliffs are shown along the sea-coast with ships at the various ports. Celtic vestiges are coloured blue; Roman, red; Saxon, white; and Danish, black. This beautiful map should be studied by day in a good light to be rightly appreciated. Thus seen, the ancient sites, and the whole configuration of Dorset, can be grasped by a map-reader, while the place-names (also printed in green) are sufficiently legible, though subordinate. But if this map is studied at night—then the place-names are read with difficulty, and the map-reader will probably grumble, instead of acknowledging the ability of George Hillier's work.

The Index briefly classifies, and indicates (in a sectional arrangement) the various sites marked in the Map. Both Index and Map are possessions to be sought for, and are valuable contributions to the knowledge of local earthworks—minor errors may be left for discovery by the enquiring possessor, remembering, that "the man who never made mistakes, never made anything."

"*The Celtic Tumuli of Dorset,*" by Charles Warne, published by John Russell Smith, Soho Square, London, cr. Folio, 1866, is both a record of original unpublished researches, and also a collection of scattered published records presented in convenient form for reference At the end of the book there are twelve excellent plates, etched by T. Cleghorn, of urns and relics found

*2. The Dorset Natural History and Antiquarian Field Club was inaugurated March, 1875, and its first volume of Proceedings was issued in 1877.

in these Dorset excavations, and a bird's eye view of the group of Woodyates barrows (taken from Hoare's "Ancient Wiltshire").

The book is divided into three parts. *"My own personal researches."* (46 barrows). *"Communications from personal friends,"* (44 barrows)—the most important of which were communicated by Rev. John H. Austen, of Tarrant Keynstone, and William Shipp, of Blandford. And, *"Tumuli opened at various periods,"* (100) which include 34 barrows opened by Sir R. C. Hoare and William Cunnington near Woodyates (abridged from "Ancient Wiltshire"), "The Deverel Barrow," by W. A. Miles —six barrows opened by Dr. Milner near Lulworth; five by Rev. J. J. Smith near Bincombe in 1842, and "The Badbury Barrow" —together with nine barrows in the Isle of Purbeck opened by the Rev. John H. Austen, etc.

Dr. Wake Smart contributed an excellent paper to the *"Dorset Field Club Proceedings,"* Vol. IX. 1886, analysing the contents of 160 of the Tumuli described in "The Celtic Tumuli of Dorset," by Charles Warne, in which he classifies them, and shows (inter alia) that the total number of interments in such 160 barrows, amounts to 500—236 in urns, 264 without urns—cremation: 318, inhumation: 182—giving a percentage of 63.6, cremation; compared with 36.4, inhumation.

Charles Warne was curiously lacking in appreciation of plans and sections for recording excavation, and earthworks. Only two barrow sections are given in this book, and not one ground plan—a lack of appreciation that is even more felt in his subsequent work, *"Ancient Dorset,"* printed for the author and subscribers only, by D. Sydenham, Bournemouth, cr. folio, 1872. This book begins with "An Introduction to the Primæval Ethnology of Dorset," by Dr. Wake Smart, and then proceeds to give Charles Warne's superficial survey of the various ancient earthworks, in periods—British—Roman—Saxon and Danish; with topographical observation; records of objects found in various sites; and a final summary of the coins struck by the Saxon, Danish, and Norman Mints of Dorset, illustrated by two good plates; and an article by Dr. Wake Smart on "The ancient use of Kimmeridge coal"—also well illustrated.*3. The book also contains three plates by F. W. Fairholt, illustrating, in his usual excellent manner, relics found on Hod Hill. The site views etched by T. Cleghorn, have a certain charm in their delineation, but make "mountains of mole-hills"—Dorset hills may be steep —but never so precipitous as the foreground hill shown in the "Conigs Castle" etching! Archæologically, they have no value.

*3. Dr. Wake Smart also contributed to "Ancient Dorset" an article on Cranborne Castle, and another on "Clavinio," a Roman site on Jordan Hill, near Preston, excavated 1843 to 1846, by Mr. Medhurst, of Weymouth, of which the excavator published no record, and we only know how much we have lost thereby from notices by Dr. Buckland, Charles Warne, and Dr. Wake Smart.

There is so much good field work in " Ancient Dorset " that one all the more regrets ground-plan deficiency in the numerous earthworks described, while the sections of five earthworks thus illustrated are quite fantastic.

Besides being a recorder of Dorset antiquities, Charles Warne was also a discerning collector, as may be seen at Dorchester Museum in " The Warne Collection." We have also to thank him for his constant protests on behalf of ancient earthworks in his county. Indeed Dorset archæologists owe a debt of gratitude to Charles Warne. He died in 1887 aged 81.

General Augustus Henry Lane-Fox inherited the Rushmore estates in the year 1880, in accordance with the will of his great-uncle, the second Lord Rivers, which provided that he should assume the name and arms of Pitt-Rivers. He was fifty-three years of age when he entered into his inheritance, and was specially qualified by his original genius, anthropological and archæological researches, experience in excavation, and gift of precise record, to (in his own words) " devote the remaining " portion of my life chiefly to an examination of the antiquities " on my own property "—which extended over 29,000 acres, situated principally in Dorset and partly inWiltshire.

Rushmore House stands in Wiltshire, close to the county boundary of Dorset, and General Pitt-Rivers' excavations extended over his shire and neighbouring county in almost equal amount; but in view of the fact that all the relics discovered in such excavations were placed in the Museum that he built at Farnham, Dorset, it seems that this county has the prior claim to include General Pitt-Rivers' name as one of its benefactors—indeed its greatest archæological benefactor.

It is very rarely that the right man and the full opportunity meet, but they did here, and the result is chronicled by General Pitt-Rivers in his four classic quarto volumes, *" Excavations in Cranborne Chase,"* printed privately. It is a great work that set a new standard for excavation, for graphic presentment of the same and of objects found in the process, and for record. Pre-Pitt-Rivers and Post-Pitt-Rivers mark different eras in archæological research and record.

Thus, year after year, from 1880 to 1899, he fulfilled his intention quoted above—ably served by his assistants, whom he trained in survey, supervision, record work, etc., and all of whom have subsequently advanced the science of archæology.

The principal contents of the four volumes are as follows :—

Vol. I.—Romano-British village, Woodcuts, and Rushmore Park.

Vol. II.—Barrows near Rushmore. Romano-British village, Rotherley. Winkelbury Camp. Anglo-Saxon Cemetery, Winkelbury Hill.

Vol. III.—Bokerly Dyke and Wans Dyke.
Vol. IV.—South Lodge camp, Rushmore Park. Handley Hill Entrenchment. Stone and Bronze Age barrows and camp, Handley. Martin Down camp.

The sites of many British villages had been recorded by Sir R. C. Hoare in "Ancient Wiltshire," but not one of them had been scientifically examined until General Pitt-Rivers conducted his thorough excavations in Woodcuts and Rotherley, recorded in Vols. I. and II. respectively. "They were proved to be of "Roman age, though probably occupied chiefly by Britons, one "or two British coins having been found with the Roman ones, "in both villages."*4. Their inhabitants were of small stature, the average of 26 skeletons showed 5 feet 2 inches for males, and 4 feet 10 inches for females. They lived in wattle and daub huts, on areas that were carefully drained by ditches, and numerous pits were found adjoining the inhabited areas, filled up with soil and refuse. A few hypocaust fireplaces indicated the Romanisation of the inhabitants, and most of their pottery and metal was of Roman type.

General Pitt-Rivers only made partial excavations in Winkelbury Camp, and the evidence thereby obtained led him to think that it was "probably pre-Roman, and was very little, if at all "occupied by that people." The relics found were mostly of the Iron Age. The distinctive quality of the pottery consisted in its being mixed with oolitic grains. Similar pottery has been recently found by Mr. and Mrs. Cunnington in their excavations at All Cannings Cross. "All the pottery from Winkelbury "illustrated on Plate CXLVIII, 'Excavations,' Vol. II., with "the exception of figs. 7 and 10, Romano-British wares, might "have come from All Cannings Cross." cf. *"The Early Iron Age inhabited site at All Cannings Cross Farm, Wilts,"* p 196, by M. E. Cunnington. (The excavators date this site, circa 500 B.C.)

One cannot help wishing that a trench had been taken across the wide entrance of Winkelbury Camp—such as Mr. and Mrs. Cunnington took across the entrance of Oliver's Camp, Devizes, thereby finding four large postholes for a barricade, stockade gate.

From 1888 to 1890, General Pitt-Rivers intermittently excavated in Bokerly Dyke, on each side, where the highway from Salisbury to Blandford passes through the Dyke. This portion of Bokerly Dyke was proved by excavation "to have

*4. One hundred and ninety-four coins were found at Woodcuts, of which four were British and the rest Roman—from Caligula, A.D. 37—41, to Magnentius, 350—353. Fifteen coins were found at Rotherley, of which two were British, 12 Roman, and one Mediæval. The Roman coins were from Trajan, A.D. 98—117, to Tetricus, 267—272.

been thrown up no earlier than the reign of Honorius, " A.D. " 375-423, and possibly by the Romanised Britons as a defence " against the Saxons."

These excavations in Bokerly Dyke, led General Pitt-Rivers to conduct an excavation in WansDyke, Wilts, near Shepherd's Shore, where he dug two sections across this earthwork—of which he says, " we are unable to fix the date of Wansdyke with the " same certainty as that of Bokerly, although its Roman, or post- " Roman origin has been satisfactorily determined."

The principal contents of Vol. IV. are (1) the excavation of South Lodge Camp, Rushmore Park, and (2) of Martin Down Camp, both of which General Pitt-Rivers claimed as examples of Bronze Age camps.—Subsequent discoveries, specially by Mr. and Mrs. Cunnington at All Cannings Cross, and Lidbury Camp, Wilts, arouse some questions as to such attribution. Dawn of Iron Age, with later excavation knowledge to help us seems now to be an equally probable period for the approximate dating of these two camps.—And (3) the excavation of Wor Barrow, the only long barrow in this district that has been completely excavated. It was surrounded by a great quarry ditch, cut very irregularly, about 13 feet in depth and 12 feet wide at the bottom, average sections of which, together with finds are shown in Plates 250, 251. Four causeways crossed this ditch. In the upper part of the barrow mound ten secondary interments were found that were probably Romano-British. In the centre of the barrow on the old surface line, an oblong trench, cut in the solid chalk, enclosed an area (with entrance on the south side) 93 feet in length by 34 feet in width, in which traces of wooden piles were discovered. " This may in all probability be a wooden version of the stone " chambers so often found enclosing the interments in long " barrows in other districts where stone has been more easily " obtained than wood." Six primary interments were found on the old surface line, at the southern end of the above oblong enclosure. Three of these skeletons were in sequence, crouched, the other three skeletons were not in sequence. Their skulls showed that they belonged to people of the New Stone Age. The stature of the six primary skeletons (all male) varied from 4 feet 10 inches to 5 feet 9 inches, their average being estimated at 5 feet 2.7 inches. No relics were found with the primary interments.

That excavated barrows should always be restored to their profile before disturbance, is surely due to these earthen memorials of our great forefathers. In this instance desecration was deliberately carried out : " The materials from the body of " Wor Barrow were formed into an amphitheatre with terraces, " with a view to using the old surface line of the Barrow as an " arena for games or other amusements, and exhibitions," p. 74. Protest must be recorded against such irreverent treatment of a Stone Age burial site, that should have been regarded as a

National Monument—to be preserved (so far as possible) in the state existing before excavation.

The Prefaces and Introductions to each of the four volumes of "Excavation in Cranborne Chase," contain shrewd and illuminating dissertations both of practical and theoretical value for excavators, of which the following extracts may be taken as samples :—

On method of conducting excavation. "In the excavation "of the ditches of camps and barrows, attention should be given "to the method of conducting the excavation. The most "natural way, the easiest, and the one most generally adopted is "to dig down to the bottom in one spot, and then work out the "ditch horizontally all along. This frequently leads to error in "assigning the fragments of pottery and relics to their proper "*gisement.* Fragments from the top fall down and are picked "up on the bottom, to which part they are often erroneously "attributed. The proper way is first to take off the turf over "the whole area which it is intended to excavate, and then to "work down from the top in a succession of spits; in this way "the pottery and relics from the upper spits are removed and "recorded before the lower spits are dug into, and no mistake "as to the depth of the objects can possibly occur." Vol. IV. p. 26.

On the value of full record. "Excavators, as a rule, record "only those things that appear to them important at the time, "but fresh problems in Archæology and Anthropology are con-"stantly arising, and it can hardly fail to have escaped the "notice of anthropologists, that, on turning back to old accounts "in search of evidence, the points that would have been most "valuable have been passed over from being thought uninterest-"ing at the time. Every detail should, therefore, be recorded "in the manner most conducive to facility of reference, and it "ought at all times to be the chief object of an excavator to "reduce his own personal equation to a minimum." Vol. I. p. XVII.

"I have always remembered a remark of Professor Huxley's "in one of his addresses. 'The word—importance—' he said, "'ought to be struck out of scientific dictionaries; that which "'is important is that which is persistent.' Common things "vary in form, as the idea of them passes from place to place, "and the date of them and of the places in which they are found "may sometimes be determined by gradual variations of form. "There is no knowing what may hereafter be found to be most "interesting." Vol. IV. p.27.

"I am informed that there are people who think they are "doing good by digging and grubbing out antiquities without "making any record at all of their investigations. . . A dis-"covery dates only from the time of the record of it, and not "from the time of its being found in the soil." Vol. IV. p.28.

On the value of knowledge of pottery for dating purpose. "Next to coins, fragments of pottery afford the most reliable of "all evidence, and, on this account, I have elsewhere spoken of "pottery as the human fossil, so widely is it distributed. . . A "good knowledge of local kilns will therefore greatly add to our "knowledge of earthworks; but investigations into the sites of "ancient potteries can hardly be said, as yet, to have become so "serious a study as the subject demands." Vol. III. p.X.

On ancient warfare, and methods of defence. "I have "frequently heard observations made on this subject, which "appear to me, from a military point of view, to be erroneous. "The isolated camps, with which the map is studded, which—"though called camps—were in reality permanent fortifications, "are sometimes spoken of, as having been thrown up for the "defence of a particular district. But, apart from the fact that "they are pretty evenly distributed over the country, occupying "the most elevated positions, as they happen to occur, and not "in lines drawn along the frontier of any particular part, there "is reason to doubt whether such detached fortresses, could, in "those days, have served the purpose of defending a district. "In modern times we erect fortresses on the frontiers of great "States, for their defence, because the great armies of our day "are encumbered with large supplies of food and ammunition, "that have to be drawn from the rear, and for which it is neces-"sary to keep open lines of communication with the base of "their operations, and the frontier fortresses of an invaded State "serve for the defence of that State, because it is impossible for "an invading army to pass between them, without exposing its "lines of communication. But in barbarous times, such "*impedimenta* did not exist in connection with invading forces; "their objects were, for the most part, predatory, and their "wants were few; they could penetrate between the fortified "places, and subsist by plunder in the country surrounding them, "and the defenders of the fortresses, if they kept on the defensive, "and remained shut up in them, would only have to look on. "Wherever, therefore, we find such isolated encampments on "the tops of hills, in prehistoric times, we may be sure that they "were simply places of refuge for some local tribe, inhabiting "their vicinity, to which they resorted when attacked by a neigh-"bouring tribe. They imply a low state of civilisation, before "the inhabitants of any large district had attained to that "organisation as was necessary for combined defence.

"When the people advanced to a higher state of civilisation, "and several tribes combined for the defence of a district, it "was not by detached forts, but by continuous entrenchments, "that they accomplished their object. They threw up continuous "lines of ditch and bank, the latter probably surmounted by a "stockade, running for miles along the open country, from an "inaccessible position on one flank, to some other natural defence

" on the other flank. This was the system adopted, and the " Romans used it, not only in the North of Britain, as a defence " against the Picts and Scots, but also in the more extended " defence of their German frontier, by means of the Pfahlgraben, " joining the Rhine and the Danube." Vol. III. pp. 7, 8.

In addition to these four volumes of Records, Plans, Illustrations and Tables, General Pitt-Rivers further displayed his discoveries in a Museum which he built near Farnham, Dorset. Here, all the relics, with the pottery restored, together with skulls and limb bones found in the excavations, are admirably arranged and shown in cases, beside large-scale, descriptive models of the various excavated sites. Such an opportunity for local archæological study is surely unique; and for those who have had the good fortune to profit thereby—first in visiting ancient sites on Cranborne Chase—and then in poring over the Farnham Museum models of such excavated sites, the remembrance will abide as a revelation of, and an incentive to, scientific excavation.

WILTSHIRE.

And now we come to Wiltshire, which is pre-eminent among our three counties for its pre-historic remains, to wit—Avebury, and Stonehenge—Barrows, long and round*5.—camps—habitation sites—Wansdyke—boundary ditches, etc., etc. Earthworks of every description. Wiltshire is also pre-eminent in having had a succession of archæologists, variously gifted, but persistently recording during the last 250 years. Here, we commemorate a great company of benefactors—beginning with John Aubrey.

John Aubrey, of Lower Easton Piers, Kington St. Michael, and tenant of Manor Farm, Broad Chalke, both in the county of Wilts, was born in 1625. He was a life-long antiquary and natural science observer, with an unfortunate bias towards indiscriminate collection of hearsay marvels, that has tended to delay recognition of the worth of his own original, archæological observation and record. He lived and died a bachelor, in spite of numerous love affairs to which he thus refers in his autobiography :—" 1640-50. I was suitor to Mistress Jane Codrington." " 1651. I sawe that incomparable good conditioned gentle- " woman, Mistress M. Wiseman, with whom at first sight I was " in love." " 1655. This yeare and the last was a strange " yeare to me. Several love and law suits." " 1657. Nov. 27. " Obiit Domina Kasker Ryves, with whom I was to marry, to " my great losse." " 1665. I made my first address (in an " evil hour) to Joane Sumner. She lived with her brother at

*5. cf. " A list of pre-historic, Roman and Pagan Saxon Antiquities in the County of Wiltshire," by Rev. E. H. Goddard. Total number of round barrows, 1768. Long barrows that can now be identified, 86 (contributed by Mrs. M. E. Cunnington).

" Seend." This appears to have been the last of John Aubrey's many, protracted love affairs, and to have ended disastrously. " 1666. This year all my business and affairs ran Kim Kam." " 1667. December. . . . arrested in Chancery Lane at Mrs. " Sumner's suite." We are not told what this " suite " was about, but we gather that his business and affairs continued to run " Kim Kam," for in 1669 (owing to pecuniary losses) he was obliged to sell his Wiltshire property, and passed the later years of his life in, or about London, and died in 1697. From 1656 onward he wrote several works principally relating to antiquities, natural history and geology of his county, all of which remained unpublished until the 19th century. He also wrote a collection of " Miscellanies," relating to dreams, apparitions, witchcraft, etc., which unfortunately for his credit, was printed and published during his lifetime. During the 19th century, however, John Aubrey came into his own through the labours and research of John Britton, and of Rev. John Edward Jackson, and he is now recognised as the father of Wilts archæological research.

" *The Natural History of Wiltshire,*" by John Aubrey, edited by John Britton, published by the Wilts Topographical Society, demy quarto 1847, contains much local knowledge and curious observation that are of real value. His rides to and fro, from North Wilts to the verge of South Wilts—from his property at Easton Piers, to his farm at Broad Chalke, were utilised in gaining wide outlook and detailed information, by the way, throughout his county; but with special zest, enquiry and admiration around the down and valley farm which he rented (from Lord Pembroke) at Broad Chalke.

" *Wiltshire. The Topographical Collections of John Aubrey,*" A.D. 1659-70, corrected and enlarged by Rev. John Edward Jackson, published by the Wilts Archæological Society, demy quarto, 1862, record the persistent pursuit of the author throughout the Northern portion of the County, in quest of ecclesiastical, manorial, genealogical and heraldic items of interest; and include a long extract from the MS of Aubrey's unpublished " Monumenta Britannica," now in the Bodleian Library, containing most valuable plans and description of Avebury—or Aubury, as he spelt it, which is the first planned record of this prehistoric monument that we possess.

The following extract from " Monumenta Britannica " (given in " Topographical Collections " above) tells of Aubrey's introduction to Avebury when he was 23 years of age—in 1648.

" I was inclined by my Genius from my childhood, to the " love of antiquities; and my Fate dropt me in countrey most " suitable for such enquiries.

" Salisbury-plaines and Stonehenge I had known from eight " years old: but I never saw the countrey about Marlborough " till Christmas 1648. . . . The morrow after Twelfday, Mr.

" Charles Seymour and Sir William Button of Tokenham, " Baronet, mett with their packs of hounds at the Grey-Wethers. " These Downes look as if they were sowen with great Stones, " very thick; and in a dusky evening they looke like a flock of " sheep: from whence it takes its name; one might fancy it to " have been the scene where the giants fought with huge stones " against the Gods. 'Twas here that our game began, and the " chase lead us, at length, thorough the village of Aubury, into " the closes there: where I was wonderfully surprised at the sight " of those vast stones, of which I had never heard before as also " at the mighty Bank and graffe (ditch) about it. I observed in " the Inclosure some segments of rude circles, made with these " stones, whence I concluded, they had been in the old time com- " plete. I left my company a while, entertaining myselfe with " a more delightful indagation and then steered by the cry of the " hounds, overtooke the company, and went with them to Kynnet, " where was a good hunting-dinner provided."

Again. (ibid, p. 316). Charles II., hearing that Aubrey had asserted of Avebury: " that it did so much excell Stoneheng " (sic) as a Cathedral does a Parish Church," commanded his attendance when the King visited this site, and further that he should write a description and present it to the King—" In " September following (1663) I surveyed that old monument of " Aubury with a plain-table, and afterwards tooke a Review of " Stonehenge: and then I composed the following discourse in " obedience to his Maties command. . . wch he commanded me " to put in print."

The King's command (without attendant contribution) resulted in Aubrey's description of Avebury (dated 1665) remaining in MS until 1821, when Sir R. C. Hoare printed it in " History of Ancient Wiltshire. North."

That John Aubrey was a reliable observer is shown by comparing his original plan of Avebury, with Philip Crocker's plan (taken in 1812) published in Sir R. C. Hoare's " History of Ancient Wilts. North." Both represent what Aubrey calls " an ill-shaped monument," of irregular circular form, whereas Stukeley's plan (taken in 1724) represents it as a true geometrical circle. Sir R. C. Hoare warns his readers that " no dependance " is to be placed " on Stukeley's outline of the earthwork; but of Aubrey's plan he says, " on comparing it with our's I find a " great resemblance between them."

Such confirmation of John Aubrey's " Survey of Aubury " plan, also supports the presumption that his second plan is approximately correct of " The whole view of Aubury with the " walke and the lesser Temple attendant to it," wherein he shews a straight avenue of stones issuing from the South side of Avebury and so continuing to " West Kynnet," where it turned East, and led to stone circles (two, one within the other) on

Overton Hill. It is curious that no such stone avenue is shown in his plan, issuing from the West side of Avebury and so continuing to Beckhampton (as in Plate VIII. " Abury a Temple of the British Druids " by William Stukeley, 1743), curious, because Aubrey must have often passed Beckhampton on his way to and from Avebury, and Mr. O. G. S. Crawford's recent discovery of unpublished drawings by Stukeley at Dinmore Court, among which was one of Beckhampton Avenue, shows that thirty-four stones existed when he made his plan (circa 1723), of which all but three had then fallen. (*Wilts Archæological Magazine,* Vol. XLII, p. 43).

In " *Stonehenge and its Barrows*," by William Long, published by Wilts Archæological Society, Devizes, medium 8vo, 1876, John Aubrey's account of Stonehenge is given from his " Monumenta Britannica," together with his plan of " The Icknographie of Stoneheng as it remaines this present yeare 1666." The discovery in recent times, of a continuous circle of stone-holes within the area, beside the surrounding bank, was due to this plan; and the excavators (Colonel Hawley and R. S. Newall) accordingly have named these, " Aubrey holes." John Aubrey's local knowledge and correct observation are shown in the following remarks in his account: " 'Tis strange to see how " Mr. Camden, Dr. Hakewell in his Apologie with severall others " (even Dr. Robt. Plot) should imagine that these stones are " artificiall, 'tis apparent they are certainly the stones of the " Grayweathers, distant from hence not above fourteen miles, " where there are thousands of such stones to be drawn out of " the earth."

William Stukeley was born in 1687. He took his degree as Doctor of Medicine in 1719, and practised at Boston, London and Grantham. In 1729, he was ordained, and presented to the living of All Saints, Stamford. In 1747 he vacated his country preferment, and was presented to the Rectory of St. George's, Queen Square, London, and died in his seventy-eighth year, 1765.

Dr. Stukeley's professional career, either as a doctor, or as an ecclesiastic, does not concern us: but his persistent curiosity as an amateur, in the true sense of the word, an amateur archæologist, does. He may have been credulous, and he was obsessed by theories, which he strove to *confirm*, not to *test*, but he observed, recorded, collected and enquired unceasingly, and for this he is held in remembrance; notwithstanding his aberrations, we must be grateful to Stukeley for his indefatigable record, by pen and pencil, of the earthworks and antiquities which he visited as a curious wayfarer, at a time when such antiquities were generally ignored.

We must forgive his constant attribution of British earthworks to the Romans, such as Beacon Hill, near Kingsclere, Bury Hill, near Andover, Barbury, near Marlborough, Badbury,

Cheselbury, Clorendon (which name he gave to Figsbury), Maiden Castle, Martinsell, Oldbury, and Poundbury, all within our three counties' radius, and all included under "Roman camps!" Though he misread such earthworks we must remember that in many instances he was a pioneer in their discovery, and that his Itinerarium supplied archæological sign-posts where none had pointed before.

The archæological surveys and records that Stukeley published relating to Wilts, Dorset, and Hants, are the following:— "*Itinerarium Curiosum.*" Vol. I. by William Stukeley, M.D., F.R. and A.S. London, tall demy quarto, 1724. (Vol. II. was published in 1776, a year after his death). "*Stonehenge A Temple Restored to the British Druids,*" by William Stukeley, M.D., Rector of All Saints in Stamford, London, printed for W. Innys and R. Manby, at the West End of St. Paul's, tall demy quarto, 1740. And, "*Abury A Temple of the British Druids,*" by William Stukeley, M.D., Rector of All Saints in Stamford, London. Printed for the Author: and sold by W. Innys, R. Manby, B. Dod, J. Brindley, and the booksellers in London. Tall demy quarto, 1743.

Iters VI. and VII. in "Itinerarium Curiosum" are the chapters that deal mostly with Wiltshire, Dorset and Hampshire. All the plates in Iter VI. are dated 1723. Those in Iter VII. are dated 1722-24. During these three years Stukeley (then a Doctor of Medicine between thirty and forty years of age) worked indefatigably at his archæological field-work in our three counties: his plates in "Stonehenge" (published in 1740) are dated 1722-24, and in "Abury" are dated 1721-24, a first rough sketch in his common-place book being dated 1719. During this period he often stayed at Wilton with Lord Pembroke, and at Marlborough with Lord Hertford, both of whom, and Lord Winchelsea, were his constant companions. Their expeditions were comfortably planned, to judge by the Doctor's Prospects and Views, wherein he shows the archæological party riding, accompanied by a two-wheeled vehicle presumably conveying refreshments. Sometimes the Doctor is shown drawing alone in the foreground, with his horse looking on at the result. Sometimes they seem to have had fair companionship. Evidently much good fellowship existed amongst this little band of archæologists, each of whom assumed a classical nickname—Lord Pembroke, *Magnus Carvilius.* Lord Hertford, *Segonax.* Lord Winchelsea, *Cingetorix,* and Dr. Stukeley, *Chyndonax.* Moreover both he and his assistants worked hard—"Lord Winchelsea was with me the whole day "and helpt me to measure till he was tired to the last degree. "We took I believe among us 2000 measures. . . . . Lord "Winchelsea has workt very hard, and was ravisht with Stone-"henge—it was a great strife between us, which should talk of "leaving it first." (*Letters from Stukeley to Roger Gale,* July

22, 1723. Stukeley's Diaries and Letters. The Surtees Society. Vol. III.). What happened to the Doctor's patients is not recorded during the long absences that such numerous surveys, measures, plan and prospect drawings and rides through many distant counties must have entailed.

The " Busto " engravings of Stukeley as *Chyndonax* in " *Itinerarium Curiosum,*" and " *Stonehenge,*" suggest the head of an alert, eager man, with a dash of vanity—that curious quality that leads one to under-rate ability.

Stukeley's monograph on " Stonehenge " testifies to the assiduous labour that he bestowed in studying, measuring, and recording the site and its surroundings. Sir Richard Colt Hoare thus refers to it in " History of Ancient Wiltshire," p. 140 : " The work of Dr. Stukeley published in 1740, has rendered all " former accounts of Stonehenge nugatory and unsatisfactory. " He differs widely in opinion and plan from his predecessors : " he saw with his own eyes, and dictated from his own good " sense and sound judgment. . . . and whilst the remarks of " former writers have been confined to the sole building, and " many of them retailed from others preceding, those of " Stukeley have been extended to various other antiquities in the " neighbourhood, and marked with accuracy and able discrimina- " tion."

Again in " *Stonehenge and its Barrows,*" by William Long, he says (p. 89) " Neither Webb nor Aubrey appear to " have found out the avenue or cursus, and Stukeley might fairly " claim to have been the discoverer of them both." It must be added that the work is encumbered with imaginary Druidical suppositions, and with digressions on Patriarchal, Herculean and Phœnician Temples. In dealing with Aubrey's earlier plan of Avebury (taken about 1663) I have noted the discrepancies of his plan with Stukeley's : and Rev. John Edward Jackson, the Editor of Aubrey's " Wiltshire Collections " (p. 326), adds caustic comment on Stukeley's " Dracontium " statements as to Avebury.

" *The Ancient History of Wiltshire,*" by Sir Richard Colt Hoare, is dedicated by him to William Cunnington of Heytesbury, who, in the words of the dedication, " first projected the " plan of this History, and by your interesting Collection and " important discoveries encouraged me to pursue it."

This project, and its subsequent pursuit and fulfilment, after some twelve years of persevering field-work at the beginning of the nineteenth century, resulted in the production of two stately Royal folio volumes that gave a new standard for ancient earthwork observation and record. No county had hitherto been so comprehensively explored in search of its ancient earthwork remains, nor so admirably described by survey, record, maps,

plans and illustrations. " The Ancient History of Wiltshire " is truly an original work that finely commemorates both its author, delineator and projector.

It was issued in three parts. *" The Ancient History of South Wiltshire,"* in 1812, published by William Miller, Albemarle Street, London. *" The Ancient History of North Wiltshire,"* in 1819. Published by Lackington, Hughes, Harding, Mavor, and Jones, Finsbury Square, London. And *" Auncient Wiltescire. Roman Aera,"* in 1822. Published by Lackington, Hughes, Harding, Mavor, and Lepard, London.

Sir R. C. Hoare was fortunate in his choice of Philip Crocker as his surveyor and artistic delineator. Philip Crocker contributed maps (engraved by J. Cary), plans, figures of objects found (engraved by James Basire), *6. and prospects of sites (engraved by James Basire and G. Cooke) all of which achieve a high level of excellence. James Basire's rendering of stone, pottery, metal, bone, amber and glass objects show intimate feeling for form and texture, and great skill in the graphic reproduction of the same by means of pure line engraving. Here also, Sir R. C. Hoare was fortunate, for this happy alliance between surveyor and engraver continued unbroken throughout the decade during which this work was produced. Both Philip Crocker, surveyor, and James Basire II. engraver, were graphic benefactors to Archæology. The varied results of their past labours provide guidance and information of abiding value.

A fox-hunting squire who gives up the chase in favour of hunting for earthworks and antiquities is of rare occurrence. Such was Sir R. C. Hoare. Certainly he brought a keen, trained eye for country to his new pursuit, and he imparts pleasures as of the chase (" and, with my horse, enjoyed the verdant turf ") in describing his long rides across the spacious downs of Wiltshire—whereon he discovered a multitude of ancient sites then still existing, undisturbed by the plough. His area of survey was specially rich in barrows, the various type forms of which he clearly distinguished and figured in his introduction. The nomenclature that he adopted for such types, has been superseded in some instances, but his figures of barrow forms are still useful and cover the facts. Indeed, throughout his survey of ancient earthworks our praise and thanks are constantly due. It is difficult, however, to write of Sir R. C. Hoare's hasty excavations, in which he was frequently assisted by William Cunnington. Their diggings were principally conducted in search of objects, i.e., barrow contents of pottery, metal, stone, bone, glass and

* 6. There were three James Basires, all of whom were engravers to the Society of Antiquaries, namely, James Basire I, b. 1750, d. 1802 (to whom William Blake was apprenticed 1771-8); James Basire II (son of the above), b. 1769, d. 1822, who was the engraver of plates in " Ancient Wiltshire "; and James Basire III (son of James Basire II), b. 1796, d. 1869; cf. Bryan's Dictionary of Painters and Engravers, New Edition, 1920.

amber—paying small attention to skeletons, and in so doing (it must be said) they destroyed much prehistoric evidence. Our archæological forefathers loved their cabinet collections, and vied, one with another, in amassing specimens over which they discoursed with ample hospitality attendant. Although we must deplore their omission of exact skeletal record, we must also admire their arduous search for, and preservation of objects of antiquity, which now enrich the Devizes Museum.

I think that (owing to the plates) the great folio size of "The Ancient History of Wiltshire," rather disguises its essential character. It is an open-air book. "Archæological Rides," a precursor of Cobbett's "Rural Rides," (less political propaganda), but owing to its size and weight—each volume weighing over 12lbs., and requiring table space of 2 feet 6 inches by 1 foot 6 inches for perusal—these great books are relegated to the shelf of standard works that are consulted rather than read; whereas "The Ancient History of Wiltshire" is really an archæological and topographical Guide to the County, a classic among guide-books, that the wayfarer wants to have in his pocket for reference, whether afoot or awheel, and to read when he is taking his ease after a long day spent among earthworks on the downs.

It is the achievement of a great amateur, in the true sense of the word. Sir R. C. Hoare loved his pursuit, and he never lost the fresh enjoyment of his quest, nor of its setting, nor failed in his power to convey such enjoyment to his reader. His work is unique of its kind, and will thus remain—for during the last hundred years land surfaces everywhere have been so much changed by cultivation and by building, and road-making activities, railways, etc., that earthworks no longer subsist, as formerly, in the comparative safety of dereliction. There is no county now that would present such a field for ancient earthwork survey and discovery as did Wiltshire at the beginning of the 19th century.

Sir R. C. Hoare died in 1838, aged 78 years, before the completion of his other great work, namely, "The History of Modern Wiltshire."

William Cunnington's name has been mentioned. There were two William Cunningtons, both of them were pre-eminent benefactors to Wiltshire Archæology, and one of them to Wiltshire geology.

William Cunnington, Senior, F.S.A., who was Sir R. C. Hoare's co-adjutor in his Ancient Wiltshire survey, as aforesaid, was occupied (inter alia) with life-long archæological researches throughout Wiltshire—made without view of publication (cf. "The Ancient History of South Wiltshire," by Sir R. C. Hoare, p. 166.). He died in 1810, and was thus commemorated by his

friend—" His ingenious researches are now, alas, at an " end. Death has deprived me of a worthy and intelligent " co-adjutor. He was the *Alpha* of this publication; Fate fore- " bade that he should be the *Omega.*" (cf. Op. Cit. p. 173).

William Cunnington, F.G.S., was grandson of his senior namesake, and throughout a long life (he died in 1906 aged 92) contributed many valuable papers on geological and archæological subjects to the " *Wilts Archæological Magazine,*" and enriched the geological collections of the Devizes Museum. His vigorous old age is attested by the " Catalogue of the Stourhead Collection " (now in the Devizes Museum), which he compiled when he was 82! There is an informing obituary notice of William Cunnington, F.G.S., in the " *Wilts Archæological Magazine,*" Vol. XXXIV. p. 324, with a list of his writings. Indeed Wiltshire archæological benefactions under the name of Cunnington have been many in the past (and multiply in the present).

In 1840 the Wiltshire Topographical Society was established, with John Britton as one of its Hon. Secretaries. He was an indefatigable collector, antiquary, writer and draftsman, the author of " *The Beauties of Wiltshire,*" which work led to his connection with the county, and ultimately to his making a large collection of books, drawings, etc., relating to Wiltshire—a collection that was the nucleus around which the Devizes Museum and Library has been so admirably developed, illustrating the Archæology of Wiltshire. In 1852 it was resolved by a Provisional Committee that: " having secured Mr. Britton's Collec- " tion, an endeavour be made to form a Society for the purpose " of establishing a Museum and Library, and for the promotion " of all objects connected with the elucidation and study of the " general Topography of the County of Wilts." In 1853 an inaugural meeting was held at Devizes, when the Wiltshire Archæological and Natural History Society was formed to cultivate Archæology and Natural History, and to form a Museum and Library. The first number of the Wiltshire Archæological Magazine was issued in 1854. Thus the name of John Britton should be held in remembrance as one of the founders of archæological research and record in Wiltshire.

In the year 1853, J. Y. Akerman, F.S.A., excavated an Anglo-Saxon Burial Place in " Low-field " below Harnham Hill, Salisbury, of which he gave a full and well illustrated record that was published in *Archæologia,* Vol. XXXV., p. 259. Anglo-Saxon Burial Places are very rare in South-Western Britain. This Harnham site, one at Broadchalke, one on Winkelbury Hill, another on Basset Down, near Marlborough, and a Jutish Burial Place at Droxford, Hants, are the only examples in our three counties. (cf. " *The Archæology of the Anglo-Saxon Settlements,*" by E. Thurlow Leeds, F.S.A., which contains a map of Anglo-Saxon

Burial Places in Britain, A.D. 450-650). Sixty skeletons were found which, with few exceptions, lay due East and West (the heads to the West), and all lay on the surface of the chalk subsoil, without any cists having been dug to contain the burials. "No "trace of a coffin was discovered. The greater part of the "bodies were protected by large flint stones, placed so as to "form a coffin-like cist."

A.D. 450-650 covers the probable date ascribed by J. Y. Akerman to these Harnham burials. The relics found, and figured in three plates, op. cit., may be seen in the British Museum.

The Rev. A. C. Smith, rector of Yatesbury (near Avebury), was the Hon. Secretary of the Wilts Archæological and Natural History Society from its inauguration in 1853. He was a constant field archæologist in search of ancient earthworks, and focussed his survey within a surrounding area that he could reach on horseback. Thus, for nearly thirty years he noted the ancient downland sites which are recorded in his "*Map of one hundred square miles round Abury; showing the British and Roman stone and earth works of the downs of North Wilts.*" Scale: 6 inches to 1 mile.

Unfortunately, Mr. A. C. Smith did not take the 6 inch Ordnance Survey (first issued in 1846) as the foundation for his map, but enlarged the 1 inch Ordnance Survey to the above scale, omitting contour lines and field boundaries; he however added field names, which are of much interest. This Map was accompanied by a separate Guide volume, at the beginning of which there is an Index Sheet referring to the various sections into which his large Map was divided in order to comply with Imperial Quarto size, and giving reference to the various colourings, namely Antiquities, *Red.* Roads, *Brown.* Lanes, and down-tracks, *Green.* Streams, and Ponds, *Blue.* Sarson Stones, *Yellow.* It is regrettable that the colouring of the roads, lanes and tracks was not paler in tone than that of the Antiquities. As it is, the criss-cross of thick, dark, brown and green lines dominates many of the sheets, and tends to obscure the thin red lines that mark the lesser earthworks. The Guide volume referred to above gives quotations from the best authorities respecting the principal ancient sites. The author says in his preface (p. VI.): "This book may in great measure be considered a compilation, "rather than an original work." As such, it is a very useful book of reference, and both Map and Guide are books to possess. They were published in 1884 by the Marlborough College Natural History Society, in two Imperial Quarto volumes.

Dr. John Thurnam of Devizes was a scientific barrow excavator who from 1855 to 1867, in his own words, -"occasionally sought relaxation" in opening the ancient British barrows in his county. The results of such activities were recorded in his classic

paper, published in *Archæologia,* vol. XLIII. "*British Barrows, especially those of Wiltshire and the adjoining counties,*" and he also contributed a paper at the formal opening of the Blackmore Museum in 1867, wherein he gave a "summary of "inferences which seem fairly deducible from the observed facts "as interpreted by the light of those scanty historical notices "which have come down to us." This paper is contained in "*Some Account of the Blackmore Museum,*" published by H. F. and E. Bull, Devizes, and Bell and Daldy, London, demy 8vo, 1868, and records multum in parvo.

Dr. Thurnam's Wiltshire barrow diggings were the most important pre-Pitt-Rivers excavations that have been recorded in this district.

The Blackmore Museum referred to above was formed and arranged by William Blackmore and Edward T. Stevens, and its contents are described and illustrated in "*Flint Chips. A Guide to Prehistoric Archæology as illustrated by the Collection in the Blackmore Museum, Salisbury,*" by Edward T. Stevens. Bell and Daldy, London, demy 8vo, 1870. This Museum was formally opened to the public September 5, 1867, and its future management transferred to the Committee of the Salisbury and South Wilts Museum—which had been established in 1860. The following appreciation by John Evans, F.R.S., F.S.A., shows the high estimation which he had formed of the Collection: "He "had visited a great many Museums not only in England but "in various countries, and he must confess that in no instance "whatever had he met with such a collection shown to such "advantage as the Blackmore collection in that Museum. The "collection itself was one that to him, as a collector, was per-"fectly surprising. They had not one but half-a-dozen collec-"tions, all good of their kind. The collection of American "antiquities which formed the nucleus of the Museum was, he "believed, unequalled in the world. The collection, too, of "implements from the Drift was almost unrivalled. There was "also a collection from the French caves, which hardly any other "institution could show, while the collections from Denmark, "England, and other countries where similar remains were "found were likewise admirable."

Edward T. Stevens, in addition to the above, wrote a very useful record, entitled, "*Jottings on some of the objects of interest in the Stonehenge Excursion,* Thursday, August 24, 1876," published by Bennett Brothers, Salisbury, sm. 8vo. This little book is well illustrated, and has an informing map. It is a model record of summer excursion by a science-seeking Society.

I have already referred to "*Stonehenge and its Barrows,*" by William Long, published by H. H. and E. Bull, Devizes, 1876. This work gives a most useful survey of the subject, together

with comprehensive record of previous antiquarian research, and opinion, concerning these ancient monuments, with many large plans and illustrations of objects found.

Such, yet with inevitable fear of omission in review, is my attempt to commemorate our Archæological benefactors of Hampshire, Dorset, and Wiltshire, by whose labour and learning we may profit. My foregoing survey shows the worth of individual, local, archæological research and record, and the valuable results that have been produced by the persistent endeavours of workers in this youthful branch of science. Our forefathers have done pioneer work in revealing and recording buried remains of local antiquity. They have given, we have received. It is now our turn to follow good example; to give, such as we can, to our successors, and, thereby, to show that past labour and learning were not in vain.

Selected Papers.

"Geological Epochs and the Measurement of Time."

By HENRY BURY, M.A., F.G.S.

(Formerly Fellow of Trinity College, Cambridge).

The division of geological time into three epochs or eras, Primary, Secondary and Tertiary, was first suggested about the middle of the eighteenth century, but not until the nineteenth century was it satisfactorily based on the two most important unconformities, or gaps in the stratigraphical succession. All unconformities were at that time believed to be the results of gigantic cataclysms, which suddenly broke up the crust of the earth and caused widespread destruction of animal and plant life, the last of these cataclysms being supposed to have given rise to the Noachian deluge. But gradually, owing largely to Lyell's great work on "The Principles of Geology," this belief in cataclysmic action was overcome, and the doctrine of uniformity, originally advanced by Hutton in 1785, supplanted it. According to this, the agencies now acting on the earth's surface are sufficient, if only given time enough, to produce all the changes revealed by the geological record; and even the mighty forces which folded and raised the mountain chains have been acting continuously, and were never, if the world is taken as a whole, much more active than at the present day. Denudation of the land and deposition of sediments in the sea must have gone on at all times, and it seemed to Lyell a safe inference that, as our knowledge of the whole earth grew, the gaps in the record which are so conspicuous in Europe would be filled in, and the original classification would assume more and more a local and arbitrary character.

That expectation, however, has been by no means fulfilled. The further our knowledge of the geology of the whole world extends, the more impressed we become with the rarity of these intermediate strata, and with the applicability of the European classification to all parts of the earth. When in addition we find that instead of the almost continuous processes of mountain building postulated by Lyell, periods of active (but by no means cataclysmic) folding and crumpling of the earth's crust have alternated with periods of almost complete quiescence, we feel ourselves compelled to abandon the old doctrine of uniformity and substitute for it one of rhythms or cycles of change. In these cycles two sets of forces are at work: (1) "Epeirogenic" forces which act in the vertical plane, and enlarge or reduce the continental areas by altering the relative levels of land and sea, while producing little or no distortion of the strata; (2) "Orogenic"

forces acting at right-angles to the former and producing, by tangential pressure, more or less marked folding and distortion of the strata. The former are universal, and their effects are seen in all the continents at once; but the latter are local, and although they are often sufficiently intense to produce mountain ranges (occasionally in all the continents at once) yet the number and distribution of these ranges has varied greatly in different periods, and it is even conceivable that cycles may have occurred in which there has been no appreciable orogenic change at all. If we regard each cycle as beginning with a downward movement of the earth's crust in the land areas, there is first a period of " transgression " (i.e., advance of the sea over the land) and reduction of the continental surface; and this is followed by regression of the sea, and re-emergence of the land; so that on a broad view of the case we may regard the cycles as consisting of alternations of marine and continental phases. All the marine strata with which we are acquainted belong to the former periods, while the latter are represented in the stratigraphical series by the unconformities. The orogenic forces, which appear to be at a minimum during the transgressional stage, are probably active in a greater or less degree throughout the upward movement of the crust, but do not reach their climax until the continents have attained almost, if not quite, their maximum extension; and when they have died away there follows a prolonged period of denudation, after which the land once more sinks down and a new cycle commences.

The classification into epochs takes no notice of these cycles, and, in its original form, merely selected two out of the many unconformities as specially worthy of attention; it is true that, towards the close of the 19th century, the break between the Pliocene and Pleistocene was utilised for the addition of a fourth (Quaternary) epoch, but this unconformity does not seem, when judged by the changes in the flora and fauna, to be of the same order of magnitude as those on which the old classification was based; and the change seems to have been prompted by an exaggerated idea of the importance of man, who at that time was supposed to have originated in the Pleistocene. But it is now admitted that he must have been present in the Pliocene, and as these two periods appear to belong to the same cycle, we seem hardly justified in maintaining the additional epoch.

Of far more importance are the changes resulting from increased knowledge at the other end of the scale. A hundred years ago the oldest fossiliferous strata known were the Cambrian, and the only rocks at first recognised beneath them were the " Fundamental " or " Laurentian " gneiss, which was believed to be part of the original crust of the earth, before any life existed. It was soon found, however, that between the gneiss and the Cambrian there was an immense thickness of rocks which, although much altered by heat and pressure (Metamorphic), were undoubtedly stratified; and seeing that the Primary

Epoch already contained a series of rocks far thicker than the Secondary, Tertiary and Quaternary put together, it was proposed that the Pre-Cambrian formations should be placed in a separate epoch, to which the name "Archæan"* was given; while the terms Palæozoic, Mesozoic and Cainozoic (Cenozoic) were substituted for Primary, etc. But the older names are by no means obsolete, and there has been some difference of opinion as to whether the Cainozoic covers the Quaternary.

We have now arrived at five epochs (or four if we include the Quaternary in the Cainozoic), and this is the classification generally adopted in Europe; but in America there seems to be a feeling that we might with advantage abolish this system and adopt a new one based on the more numerous cycles. Unfortunately, it is often difficult, especially among the older rocks, to say exactly how many cycles are recognisable, for the unconformities themselves might easily be overlooked where cycles have succeeded one another with little or no orogenic disturbance between; while many oscillations of level occur within the cycles themselves, giving rise to minor unconformities which are not always easily distinguishable from the major ones. In the Archæan, where, owing to the absence of clearly recognisable fossils, the difficulties are exceptionally great, at least five breaks in the series have been discovered, and further research will probably add to their number, since the whole Pre-Cambrian series appears to be as thick as all the later ones put together; but as two of these unconformities are more marked than the rest, it is usual to divide the Archæan into three epochs. An equally conspicuous unconformity, representing a prolonged period of denudation, separates the Upper Archæan from the Cambrian in all parts of the world—Europe, Asia, Africa, North and South America, Australia, and New Zealand.

Even in the Palæozoic period the cycles are not always easy to recognise, and it is uncertain whether the slight unconformity which occurs between the Cambrian and the Ordovician in Wales and Ireland, but not in America, marks a continental period or only a local oscillation. Much better defined unconformities occur at the close of the Ordovician, the Silurian, the Carboniferous and the Permian, but several writers regard the last two periods as only parts of one cycle (Permo-Carboniferous) and the position of the Devonian and Old Red Sandstone is open to some doubt. In each case more or less mountain-building accompanied the emergence of the land, the most important ranges being the Caledonian at the end of the Silurian, and the Armorican and Appalachian in the Permo-Carboniferous. The continental phase between the Permian and the Trias must, judging from the profound changes in the fauna and flora, have been an extremely long one, though in England it is marked by no conspicuous unconformity.

* By many modern writers this term is restricted to the lower portion of the Pre-Cambrian series.

In the Mesozoic era there are two well-marked periods of transgression separated by one of emergence, which shows itself in the freshwater series of the Lower Cretaceous, and in slight unconformities in various parts of Great Britain, as well as in the formation of the Sierra Nevada in North America; but in Europe generally it was accompanied by very little disturbance. The long interval between the Cretaceous and Eocene was also a comparatively quiet time in Europe, but witnessed the birth of considerable ranges of mountains in North and South America.

After the transgression of the Eocene and Oligocene, emergence followed in the Miocene, accompanied by a huge phase of mountain-building, extending to all the continents, and seldom equalled in the whole of geological history. The position of the Pliocene and Quaternary is somewhat doubtful, but the general tendency is to regard them as mere episodes in the great period of continental extension which began in the Miocene. Oscillations in level are common to all cycles, and while the Miocene disturbances were continued into the Pliocene, the continental elevation which marks the close of the Pleistocene, if it be not simply another temporary oscillation, may have initiated a period of tranquillity and denudation which will last perhaps for several million years, before a fresh transgression ushers in a new cycle.

But while even the cycles outlined above—and some writers recognise as many as fifteen—are at least twice as numerous as the four or five epochs of the text-books, they evidently vary greatly in the intensity of the orogenic forces which mark their final stages, and we therefore find a widespread tendency to select a limited number (varying from four to seven) for classificatory purposes. Thus Haug, concentrating on the great periods of mountain-building, attributes one to the Archæan, two to the Palæozoic, and one (Miocene) to the Secondary, Tertiary, and Quaternary epochs put together—the post-Jurassic and post-Cretaceous emergences being regarded as due to minor fluctuations; while Schuchert and Barrell find three in the Archæan, two in the Palæozoic, one post-Cretaceous (Laramide) and one in the Miocene. But the results evidently differ greatly according to the countries studied, and it may well be doubted whether, taking the world as a whole, the principle of selection is a sound one; though until we know more about the cycles we have nothing better to put in its place.

There are some indications of a yet larger rhythm than any we have yet considered, for so far as our present imperfect data allow us to judge, the orogenic forces show a gradual crescendo of intensity through three or four cycles, until they culminate in periods of exceptionally great and widespread mountain-building. Only four such maximum periods are recognisable in the whole of the geological record—in the Miocene, in the Permo-Carboniferous,and in two stages of the Archæan; and a curious point is

that each of them seems to have been followed by a glacial age, from which we may perhaps infer that elevation of the continents is one of the factors in producing glaciation.

While Lyell supposed that all movements of the earth's crust affected the land only and not the sea, Suess maintained that only by postulating movements of the sea-level could we explain the effect of the great transgressions on several continents at once; but what seemed impossible to him is readily intelligible under the modern theory of Isostasy, for if the continents are floating in a basaltic magma, any change in the density of that magma must raise or lower the level of all the floating masses; and it is one of the merits of Professor Joly's hypothesis* that it suggests a mechanism by which such changes of density may have been effected. He believes that the heat produced by radio-activity leads to the gradual fusion of the basalt on which the continents rest, and that rapid escape of heat is then made possible by cracks in the ocean floor and by movements of the land masses; whereupon the magma again solidifies and the cycle recommences. The initial process of heating causes expansion of the basalt and reduction of its density, thereby allowing the continents to sink deeper, and be invaded by the sea (transgression) which rests directly on the basalt; whereas the solidification of the magma increases its density, and causes the continents to rise again (emergence). But the cracks formed in the ocean floor at the time of its greatest expansion are now filled with solid basalt, so that it is too wide, when cooling contracts it, to fit into its former place, and this gives rise to such intense tangential pressure against the margins of the continents that they are folded into mountain ranges. The sequence of events outlined in this hypothesis certainly fits in remarkably well with that indicated in the geological record, but it is by no means free from difficulty, and it will probably have to undergo a good deal of hostile criticism before (if ever) it is generally accepted.

Although this hypothesis allows for considerable variation in the cycles, both in duration and intensity, Joly thinks that a fair estimate of the time required for each would be from forty to sixty million years, which would give a total of 200-300 millions if we allow five cycles in all, or 160-240 millions if we prefer the lower number of only four cycles. But even if we accept the estimate (based on very imperfect data), it would not be unreasonable to raise the number of cycles to fifteen or even more, which would give us a total more nearly in accord with recent calculations based on Uranium.

The whole problem of the measurement of geological time has been so thoroughly discussed by Professor Holmes in his

* "The Surface History of the Earth," by John Joly. Clarendon Press, 1925. See also Proc, Bournemouth Natural Science Society, Vol. xviii (1925-6) p. 64.

admirable book* that it is not necessary here to do more than summarise the position and lay stress on one or two of the more important factors. We need not pause to consider Kelvin's estimate depending on the rate of cooling of the earth, since this has been completely discredited by the discovery of radio-activity; but his argument from the sun's heat has given rise to more difficulty, as it is doubtful whether the transmutation of elements (radio-activity) can produce enough heat to satisfy our requirements. It is now suggested, however, that an immense source of heat may be found in the actual destruction of matter by the collision of the protons and electrons (positively and negatively charged particles of which the atoms are composed) setting free the whole supply of subatomic energy. Recent astronomical calculations show that this will extend the life of the sun to several billions of years, which is enough to satisfy the most exacting geologist.

Many attempts have been made to measure the age of the earth by estimating the total thickness of the strata, and the time required to form them; and in this way Sollas reduced the total to 26½ million years; though he raised it later to 80 millions by allowing a greater thickness for the Archæan strata, and more time for the periods represented by the unconformities.

Yet another method, in which Joly took a leading part, depends on the total quantity of salt (Sodium Chloride) in the sea, and the amount added annually by the rivers. From these data we can deduce the length of time required to reach the present degree of salinity, assuming that the sea was fresh to start with, and Joly's estimates on this basis range from 80 to 175 million years

Both these geological methods are full of difficulties, into which we need not enter; but their most serious drawback is the assumption that the present rate of denudation has prevailed without appreciable variation throughout geological time. For, according to the evidence cited above, the present continents are probably much above the average both in area and in mean elevation, which means that the amount of material (both solids and soluble salts) brought down by the rivers is far higher than in most geological eras, while it is not improbable that deposition has usually taken place over a wider area than at present. From these and other considerations Barrell concludes that we ought to multiply the estimates of the uniformitarians by fifteen, which would bring them up to the highest figures suggested by radio-active methods.

Attention may also be called to a source of error arising out of estimates of the rate of sub-aerial denudation, though it is long

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* "The Age of the Earth," by A. Holmes, London, 1913.

since they have been used for measuring the duration of geological time. If a continent had a mean elevation of 1,000ft., and 1ft. was removed from it, on the average, in 1,000 years, it seemed at one time obvious that the whole area would be reduced to sea-level in 1,000,000 years; but the theory of Isostasy teaches us that this is not the case. A column of ice nine feet thick floating in water will rise one foot above the surface; but we cannot reduce it to the water level by cutting off that top foot, for the whole block will rise up again until 1-9th ofthe remainder emerges —that is to say, it will stand almost as high as before. The same is true of the continents and their mountain ranges, for they are floating in a plastic magma of basalt, and as their upper portions are removed by denudation, they rise until equilibrium is restored; and therefore their reduction to sea-level must take far more time than was formerly supposed. In view of the enormous amount of denudation which some of the older mountain ranges have undergone, this is of some importance, since it suggests that the time allowances often made for the periods of emergence (unconformity) are insufficient.

But no real reliance can be placed on any of the strictly geological methods of estimating time, and our hope of obtaining accurate results lies in the study of the radio-active elements. Uranium, which is one of the most important of these elements, undergoes a slow and complicated process of decomposition, the final result of which is the transformation of an atom of uranium into one atom of lead, and eight atoms of helium. As a natural consequence of this the proportion of lead to uranium in specimens of ore from different geological formations varies with the age of the latter; and since we know the rate of decomposition, we can ascertain the length of time that the ore has been in existence by the simple process of determining the ratio of lead to uranium. The figures so obtained are exceedingly high, giving 1,200 to 1,500 millions of years as the age of the earliest Archæan rocks; and Joly, who thinks them excessive, places more reliance on results obtained by the same method from ores of thorium, which also produces lead as a result of slow decomposition. Not only does he in this way reduce the age of the Archæan rocks to 250 million years, but he draws attention to certain phenomena which he interprets to mean that the rate of decay of uranium was formerly much more rapid than it is now. Holmes, however, though admitting the facts, points out that they are capable of other interpretations; while as regards thorium, he shows that specimens from the same formation give widely discordant results, due probably to the solubility of the lead formed from this element; and since some of the analyses yield figures agreeing exactly with those obtained from uranium, he concludes that the latter, which gives more consistent results, forms the only reliable basis for our time estimates.

"Narcissi."

By H. BACKHOUSE, F.R.H.S.

The Narcissus belongs to the order Amaryllidaceæ.

It is characterised by a perianth of six segments, within which is a more or less bell-shaped crown and six stamens.

Pliny and others derive the name from Narce on account of its narcotic properties.

The popular names Daffodil, Daffadilly and Daffadowndilly are probably corruptions of the word Asphodel, or Asphodelus.

The Narcissus is by no means a modern plant; there are dried specimens at Cairo and in the herbarium at Kew, taken from mummy cases entombed fully 2000 B.C.

In 1629 John Parkinson described nearly 100 varieties of Narcissi, and we know that some old-fashioned double daffodils which are still grown to-day, such as Golden Phœnix, Orange Phœnix, and Sulphur Phœnix, or to give them their English names—Butter-and-Eggs, Eggs-and-Bacon, and Codlings-and-Cream, were known in Queen Elizabeth's time.

Some people think Daffodils and Narcissi are quite distinct flowers, but, as a fact, all the varieties are Narcissi—hence the name of the wild lent lily, Narcissus pseudo-narcissus. The name daffodil is generally applied to the flat-leaved, long-trumpet sorts, a very unsatisfactory definition, as the long trumpets merge so gradually into the short that it is impossible to tell where to draw the line.

As time goes on the number of species of most flowers tends to increase; with the Narcissus the case is the opposite. Barr, who published his book in 1884, enumerates 23 species; many of these have since been proved to be natural hybrids, and to-day there are certainly not more than nine species, viz.: Pseudo-narcissus, Poeticus, Triandrus, Jonquilla, Juncifolius, Bulbocodium, Tazetta with its two autumn-flowering forms, Serotinus, and Viridiflorus.

The geographical distribution of the Narcissus is a large one, but it does not include America or the Southern Hemisphere. Beginning in the Canary Islands on the West, it ranges across all North Africa, with headquarters in Spain and France, through England, Scotland and Wales (but not Ireland), and across Europe, including Norway, to Asia Minor, Palestine and Syria, the Himalayas, China, and as far East as Japan.

Most of the Narcissi grown in gardens at the present day are of hybrid origin, crosses between wild types, and these crosses again crossed; the result is a very much larger flower, of better form and substance and of more striking colour, and with a constitution incomparably superior to any wild form. Some of the wild types die out in a year or two if planted in ordinary garden soil, but will live longer planted in grass. It is lament-

able to see how some of the rarer sorts are being torn up and exported to this country only to die. The method employed in collecting the bulbs looks a little crude; it is simply to dig up the bulbs when in flower, cut off the flowers, leaves and roots, and dry as quickly as possible. It is a wonder so large a proportion manage to flower the next year.

The hybridist does not go about his work in any haphazard way, but thinks out carefully what he wishes to produce and the best material he has in the way of flowers to attain his object, and works accordingly, for it must not be supposed that the fine flowers now in cultivation are the result of chance. As a matter of fact very few sorts that are worth anything are self- or insect-fertilised seedlings.

In a warmer climate, where there are more insects about at the time of flowering, Narcissi seed very freely, but in England, and especially in the North, very few produce seed if left to themselves. At the same time it is advisable to run no risks, and always to remove the anthers of the flowers intended to be fertilised, as soon as the flowers open and before the pollen is ripe.

It is the simplest work possible to fertilise the flower by hand. All that is necessary is to transfer the pollen from the anthers of one flower to the stigma of another. But it must not be supposed that all flowers are capable of bearing seed; some hybrids are absolutely sterile as far as bearing seed goes, but their pollen may be good.

All the Jonquil hybrids and all the Triandrus hybrids are sterile for seed, but they produce a small quantity of good pollen. Some of the pure Trumpets are sterile, e.g., Empress Horsfieldii, J. B. M. Camm, and also some of the Medios, as Sir Watkin, and some of the Barriis, as Conspicuus; but by far the largest number of hybrids between Trumpets and Poeticus are very prolific.

To find out if any given pollen is potent it is not absolutely necessary to make your cross and await results. By examining the pollen under the microscope you can get a very good idea. The grains of good pollen look all the same size, very plump, in fact like a miniature sample of wheat. Doubtful pollen may only have a very small percentage of good grains, the remainder being all sorts of shapes, thin and transparent.

The quality of pollen varies in different seasons and from different localities. Some pollen will dry up very quickly if exposed to drying winds, but most pollen will keep good for quite a fortnight if secured in a glass receptacle.

When the fertilised flower is over and you see the ovary swelling you know the seed has set. It is then advisable to tie up the pods, otherwise they will fall on the ground when ripening, and the seed will be lost.

As soon as you have gathered all the seeds, sow at once half an inch deep in pots or pans. When you finally plant out, in (say) two years' time, you will not find the small bulbs where you

planted the seeds, but 3 or 4 inches down. If you care to give your seeds frame culture and keep them watered well into June you will hasten the flowering period by at least a year. Roughly speaking it takes about seven years, more or less, according to cultivation and variety, for a seedling to flower.

Triandrus seedlings flower in 3 years and most of the small growing varieties and Poeticus in 4 and 5, but the larger Trumpets frequently take 8 or 9.

Until the coming of the Eelworm, Tylenchus devastatrix, a few years ago, the daffodil was supposed to be fairly immune from disease. With the advent of that dreaded plague all is changed, and daffodil growers' losses during the last few years have been very heavy.

It has been found possible by immersing affected bulbs in hot water at a temperature of 110 degrees Fahrenheit, and keeping them at that temperature for four hours, to kill the grubs without injuring the bulbs. This is so much to the good if you can plant your bulbs in uncontaminated soil, but if you put them back again in their old quarters which are swarming with grubs, no good will have been done. Probably the only means of cleansing the soil are, by steam, by very strong chemicals, and by fallowing your soil for a number of years. None of these is a practical proposition for the owner of a small garden, for the grubs, which wander far, will hide among the roots of your fruit trees and hedges, only to appear again when suitable conditions prevail.

Basal rot attacks some of the weaker growing Narcissi if grown in a heavy rich soil. The remedy is to clean the bulbs thoroughly, which can be the most easily effected by allowing them to remain on the ground for a few days, when it will be found snails have done the work much more effectively than you could have possibly done it yourself. Then plant in lighter and poorer soil.

The two Narcissus Flies, Merodon Equestris, and Eumerus Strigatus, cause a certain amount of loss, but not really heavy any where. The former fly is rather over half an inch long, and lays one egg at the base of the leaves, which develops into a grub about the same length. The latter fly is little more than a quarter of an inch long, and lays a number of eggs which develop into grubs about the same length. Both feed on the interior of the bulb, hollowing it completely out and destroying it. The mature fly is hatched out in about twelve months, to mate, and continue its work of destruction. The large fly is with us every year, and the smaller one, though it lays so many more eggs, is decidedly rare.

The plants attacked are Narcissus, Amaryllis, Habranthus, Vallota, Galtonia, Scylla, Leucojum, and occasionally Hyacinth.

It is a great mistake to plant Narcissi too near together; six inches for the larger kinds and rather less for the smaller, is a suitable distance to plant. The depth should be 3 to 4 inches,

according to the size of the bulbs, or rather more if the soil is light, and its depth will allow it.

Daffodils enjoy sun or a light shade, and are never really satisfactory in places where they get none or very little.

It is a mistake to transplant oftener than once in two years, and if the bulbs are planted some distance apart they may be left undisturbed for three or even four years. Market growers, naturally, for purposes of sale, have to lift their bulbs annually. Where bulbs are planted in grass they may remain much longer, for the rate of increase is much slower.

Most of us have seen large clumps of Daffodils, growing in neglected gardens, which have long since ceased to flower. This is because they have become so thick and crowded that they have not strength enough to produce a flower bud, which is always formed in the late Spring or early Summer for the following year. Hence when you divide neglected clumps you must not expect flowers the following Spring.

Any ordinary garden soil will suit most of the Daffodils sold by dealers. An ideal soil is a deep fairly rich loam. Some of the wild species and a few garden hybrids not often met with are fastidious, and short-lived in gardens.

Splendid flowers may be produced under glass, either in green-houses or frames, but the tendency is for pale yellows to come much lighter, in some cases absolutely white.

All the Narcissus family object to strong or rank manures, either natural or artificial; the immediate result may be a rather larger flower, but it is at the expense of the bulb, which will be found to have decreased in size and become much less healthy. If the ground is poor, a good dressing of old hot-bed manure which has lost its rankness, or basic slag, or bone meal will be found a useful fertiliser.

Now that Daffodils are so largely shown, the Daffodil Committee of the Royal Horticultural Society have found it necessary to divide all the varieties under eleven divisions as under :—

Division I. *Trumpet Daffodils.*

Distinguishing character : Trumpet as long or longer than perianth segments.

(a) Yellow trumpet and perianth.
(b) White trumpet and perianth.
(c) Bi-color. Yellow or lemon trumpet, white perianth.

Division II. *Incomparabilis.*

Cup, not less than one-third, but less than length of the perianth.

(a) Yellow shades with or without red colouring in the cup.
(b) Bi-color. White perianth with yellow or red stained cup.

Division III. *Barrii.*

Cup less than one-third length of perianth.

(a) Yellow shades with or without red cups.
(b) Bi-color. White perianth with yellow or red cups.

Division IV. *Leedsii.*

White perianth, and cup or crown white or pale citron sometimes tinged with pink or apricot.

(a) Cup not less than one-third, but less than length of perianth.

(b) Cup less than one-third length of perianth.

Division V. *Triandrus Hybrids.*

All varieties obviously containing N. triandrus blood.

(a) Cup not less than one-third but less than length of perianth.

(b) Cup less than one-third length of perianth.

Division VI. *Cyclamineus Hybrids.*

Division VII. *Jonquilla Hybrids.*

Division VIII. *Tazetta and Tazetta Hybrids.*

Division IX. *Poeticus Varieties.*

Division X. *Double Varieties.*

Division XI. *Various.*

Bulbocodium, cyclamineus, triandrus, juncifolius, gracilis, Jonquilla and Tazetta species.

Awards of Merit and later First Class Certificates are awarded by the Royal Horticultural Society for flowers brought before them for the following purposes :—

(a) As a Show Flower, or Show
(b) For Garden Decoration, or Garden
(c) ,, Flowering in Pots, or Pots
(d) ,, Market Purposes, or Cutting
(e) ,, Rockwork, or Rockery

N.B.—Any one variety may be entered under more than one head.

For an Award of Merit.

If under (a) Five stems with bloom are necessary. Twelve for a First Class Certificate.

If under (b) and (d) For either Award of Merit or First Class Certificate twenty-five stems.

If under (c) and (e) Two pots or pans, with not less than three bulbs for an Award of Merit. Four pots for a First Class Certificate.

Some people think there are already too many kinds of Narcissi in cultivation, but it is easy to discard kinds you do not care about. To my mind the subtleties of form and colour which these new seedlings afford us give us a beauty of a most satisfying kind, even if it does not prove a " joy for ever."

In hybridising Narcissi, we have by no means got to the end of our tether. Every year we see new varieties produced, distinct in form and colour, and many of them an improvement on any-

thing previously raised. Hybridising and cross-breeding have played such a beneficial part in the past, and especially since the discoveries of Mendel, which have enabled us to combine in the progeny any good qualities of the parents, that we may look forward very hopefully to much more and better work being accomplished in the near future.

The gentle art of improving nature, so far, that is, as modern needs are concerned, is as yet but in its infancy. In saying this I do not forget the new fruits, flowers and vegetables raised, not only in Britain, but in France, Germany and Italy, to say nothing of other continental lands.

"Diatoms."

By F. B. TAYLOR, B.A.

Diatoms constitute the family of the Bacillariæ or Diatomaceæ of the lower Algæ. They were at first regarded by some writers as animals, and classed as Infusoria: but they are now included almost universally in the vegetable kingdom. Haeckel, however, and his followers class Diatoms with a few other minute forms of life in a group separate from Animals and Vegetables, which they call Protista. Shortly, diatoms are microscopic unicellular Algæ.

They possess a transparent siliceous shell constructed on the plan of a pill box. In the process of reproduction the cell is doubled, and in many genera the duplicated cells remain connected in a chain or filament; this chain of cells may be severed at any point without injury to the individual components of it, each of which is called a frustule. This is the reason of the name "Diatom," from the Greek, meaning "cut in two."

Each organism or frustule forms a tiny box made up of two distinct plates or valves, each possessing its own hoop or zone; one of the valves is exterior to the other, and embraces and slides over it in telescopic fashion like the lid of a pill box.

Most diatoms are exceedingly minute, and are singly invisible to the naked eye; comparatively few are 1/100 inch in diameter, i.e., as large as a small full stop. One thousand of the smallest forms would measure one inch, and only three or four of the largest circular forms and long narrow forms may reach 5 millimeters.

The siliceous carapace of the living diatom is not a true exo-skeleton, but is covered with a plasmic film; it is filled with fine protoplasm, enclosing a coloured substance called endochrome, of a greenish-yellow colour. The organism perishes, but the walls of silex form a veritable shell, which retains its shape after the death of the plant. The endochrome is modified chlorophyll, and is coloured by diatomine.

The silicate skeleton, elaborated with a thousand lines of grace and beauty and curious adornment in the arrangement of its striation and areolæ constitutes a very special charm for the microscopist in his study of the diatom, quite apart from the study of the interior economy of the cell.

The conditions essential to the growth of diatoms are moisture and light; they multiply with extraordinary rapidity in positions illuminated by and exposed to the sun, but abound less in shady places, and are never found to vegetate in darkness. They cannot therefore live in the great depths of the sea, where light does not penetrate. But their dead valves sink in the waters where they have lived, and very extensive deposits have thus been formed over vast areas of the ocean bed, especially in southern waters, where " diatoms becloud the sea." It is also found that diatoms have contributed a considerable amount of material to the formation of shoals and mud-banks and deltas of large rivers.

Diatoms reproduce themselves in various days :—

1°. By multiplication through *Self-division.*
2°. By propagation through the formation of *Auxospores.*
3°. Certain genera also reproduce by means of *Microspores.*
4°. In a few genera the formation of *Rest-spores* has been established.

1°. The process of *Self-division* takes place longitudinally, and not transversely as in the case of Bacteria and other Algæ. The two valves slide apart on their zones almost to the point of separation, the zones being often increased enormously. Meanwhile the nucleus and chromatophore divide; and silica is deposited in the mother-cell on the divided plasma, and new valves are built up, with the characteristics of the genus, opposed to the old valves : and at their circumferences new hoops or girdles are in due time formed, fitting inside the old hoops. The two cells are then complete, each consisting of one old valve and one new valve. These newly formed frustules will proceed in their turn to divide again.

It will be clear that the frustule formed upon the interior valve of the original frustule will be smaller than that formed upon the exterior valve by double the thickness of the zone. It has been calculated that the difference amounts to about one-sixtieth of the length or diameter of the valve, and if each frustule were capable of only one act of self-division, the decrease in size would be extremely rapid. But the frustule is capable of dividing itself an indefinite number of times. The valves thus given off by the exterior valve of a frustule, being all cast in the same mould, will all be of equal size and diameter, and further decrease will not occur till they in their turn begin to divide. It is therefore common to find a long series of frustules of the same size following one another in a filament. Still, the new cells will at last reach the minimum size for the particular species,

and this will give the occasion for the formation of an *Auxospore;* this however does not always take place in the very smallest cell.

2°. According to the species, one or two Auxospores are formed from a single frustule, or from the conjugation of a pair of frustules. The process commences with the dilation of the protoplasm in the frustule or frustules; under its pressure the valves are forced apart: if two frustules are engaged, their contents amalgamate. In the resulting mass one or two young frustules are produced, which grow rapidly till they acquire a length of about double that of the parent; these roughly resemble in specific characteristics the parent cell. After a few successive divisions the normal outline is regained.

3°. Rabenhorst in 1853 first described *sporulation*: he said that the frustule dilated and became filled with a swarm of tiny cells, which were released by the bursting of the membrane of the mother cell.

It was not, however, till fifty years later that Bergon's observation finally established the various stages of *Microspore* formation.

4°. *Rest Spores* or Statoblasts are formed within the frustules of Chaetoceros, and perhaps also in Hemiaulus and some other genera. These are internal secondary cases, with thickened walls, often armed on one or both valves with spines. They are formed within the mother cell at the close of its active vegetative life, and after the death of the diatom they rest at the bottom of the water till the season for the renewal of the cycle of life arrives.

These rest spores or endo-cysts were at first found in fossil deposits without any trace of the parent cell, and were treated and named as new genera. They assume various types of form in different species, but several seem to change from one type to another in the course of growth.

5°. There is yet another method of increase, which has been observed, but not fully investigated. Miniature frustules are formed in the parent cell, which multiply themselves into packets of 2, 4, 8, 16, etc., and increase in size.

The time taken in reproduction is short, a diatom reaches maturity in some six days; and writers have estimated the time then required for the production of each new cell to be from one to twenty-four hours, or even a few minutes.

Many genera and species of diatoms are cosmopolitan, occurring in all parts of the world; but there are, on the other hand, many species and genera and groups which occur only in certain seas and localities. Also, as a rule, there is a sharp distinction between marine and fresh-water species, though instances are on record where marine species have been found established beyond the reach of present tidal influence. These may have been originally transported by fish or birds, and have adapted themselves to their new environment: also we have sporadic

appearances, difficult to explain, e.g., a form found fossil in Spain and living in the Philippine Islands and nowhere else.

Several species flourish in the hot springs of California and Nevada, living in a temperature of 160 to 175 degrees Fahrenheit; they are particularly abundant in the warm waters of the Yellowstone Park, where the beds made by them cover many square miles in the vicinity of active and extinct hot springs, and vary from three to six feet in thickness. Diatoms are also found in enormous quantities in the Arctic and Antarctic regions.

Besides their ability to stand heat and cold, diatoms can survive long periods of desiccation, provided that they are not dried too rapidly; they soon revive on the renewal of moisture. Ponds and puddles dry up, and the resulting dust may be blown about by the wind carrying with it these minute forms to new and distant localities.

The gradual accumulation of the siliceous skeletons of these tiny organisms has resulted in the formation of geological strata of considerable depth, almost entirely composed of them: and from the genera and species contained therein the presence in the locality of primeval lakes or seas may be known, and whether the local climate at the time of deposition was tropical, temperate or arctic; and the occurrence of littoral species will indicate the contours of the body of water in which they lived.

Similarly the evidence of recent forms dredged from the bed of the sea may be useful in ascertaining the direction of the ocean currents by which they have been transported. The microscopical examination of the deposits of northern Germany and Denmark has furnished evidence that these strata were laid down in inlets from the North Sea, and not from the Arctic Ocean. Cleve studied the diatoms found in the glacial dust gathered near Behring's Straits, and in that gathered on the east coast of Greenland. As the species found are peculiar and different from those found in other parts of the world, he inferred that a current flows along the northern coast of Asia between the two points. Nansen proposed to utilise this current, in his attempt to reach the North Pole in the Fram, by drifting from the Siberian coast.

Besides forming strata in which their shapes have remained entire and unaltered for countless ages, diatoms have contributed material to the formation of other rocks and siliceous petrifactions. In some places they have been converted by percolating waters into opal; elsewhere with sponge spicules and radiolaria they have helped in forming the flints found in the Cretaceous strata, in some of the beds of which they are found in the company of Desmids, even in the hollows of the flint itself. It is also suggested that they may have served as cores for the grains of oölitic (Jurassic) rock. The marine deposit at Kusnetzk in the interior of Russia is supposed to belong to the Trias, and Dana says that the hornstone in the corniferous limestone of the York Town beds, coëval with the Lower Devonian (palæozoic) formation,

was probably made out of sponge spicules and diatoms. However this may be, the great beds of diatoms belong to the Tertiary and later periods. The most ancient diatoms discovered in England are those described by Shrubsole from the London Clay.

The earliest incontestable observation of a diatom on record was in 1703 in a letter in Philosophical Transactions : the drawing, which accompanies the letter is without doubt a chain of Tabellaria flocculosa. Seventy years later a few diatoms were described and figured by Otto Müller as Vorticella and Confervæ. Later he discovered the " Staff Animalcule," for which Gmelin in 1788 formed the genus Bacillaria, from which the whole group has received its name Bacillariæ. Other genera followed, and in 1824 Agardh in his Systema Algarum described the group as a special order of Algæ, under the name Diatomeæ.

Ehrenberg, writing from 1832 to 1875, and many other writers included diatoms in the animal kingdom as Infusoria, and they were so included in Pritchard's volume on that subject; though Ralfs, who wrote that portion of the work, was inclined to class them as vegetables. But in consequence of their analogy to other organisms, they are now regarded as included in the vegetable kingdom.

I must mention one unplantlike peculiarity, which certain diatoms, Navicula, Cymbella, Nitzschia and others possess in a marked degree, that is the power of independent rectilinear motion : a stately movement by which they advance in the direction of their long axis, and return in the same line like miniature submarines, very different from the jerky and uncertain path of many of the minute animal inhabitants of the water. A well-known instance is the curious sliding motion of Nitzschia (Bacillaria) paradoxa. In this case the slender cells start in a ribbon-like filament : then each individual slides along its neighbour till the whole group forms an extended rod. The cells return to their former position and slide out in the opposite direction. The operation is repeated again and again. The means by which movement is effected is undetermined, as the strongest magnifying power and the most skilful methods of observation have failed to discover the existence of any special organs of locomotion.

It is upon this power of movement, which is confined to those forms possessing a rhaphe, a slit or fold along the surface of one or both valves, that the latest classification into Mobiles and Immobiles is founded.

Besides this phenomenon of motion, diatoms are remarkable for the extreme delicacy and beauty of their ornamentation. Some valves are covered with a regular honeycomb structure, others are adorned with exceedingly minute dots and granules arranged in graceful lines or curves, usually spoken of as striæ.

Van Heurck in his Treatise on Diatoms says that these puncta or beads are alveoles or depressions; he considers that

diatom valves consist of two membranes or thin films, and of an intermediate layer, the latter being pierced with holes. The outer lamina may easily be lost through abrasion, or in the course of preparation. In some diatoms the laminæ are quite transparent; in other forms, one or other may be marked with fine puncta, either scattered over the surface or arranged in regular lines. In certain species the granules appear to be knobs or excrescences without a covering membrane.

In many diatoms the areolations themselves are marked with still finer dots, only to be detected under very high magnifications and suitable illumination; this is called secondary structure: and in some species tertiary structure has been detected.

It will also be noticed that under low or medium powers and dark ground illumination certain diatoms show most lovely shades of colour, an exquisite blue, or a glowing iridescence. These colours are not inherent, but are caused by interferences of light passing through the minute markings of the diatom as through a diffraction grating; they disappear and are resolved into dots and spherules under higher powers. The great beauty of these markings, which are so rigidly exact and yet so infinitely diversified, refuses to fit in with the theory of an absolute utilitarian origin of specific differences.

In their manner of growth some diatoms are free, others pass their existence attached to foreign bodies by gelatinous stalks or stipes; in other genera diatoms are enclosed in gelatinous masses, or grow in more or less definite gelatinous fronds like miniature shrubs, or are united in long filaments. In some genera the individuals of the filament are held together by plasma exuded from the surface of the valves, or from protuberances on the surface, called processes: these processes are sometimes capped by claws or spines which effect the union between the frustules.

The outlines of the valves are varied, some are circular or oval or linear, others more or less crescentic or arcuate; others are triangular, four-sided or polygonal, or cuneate or sigmoid. The prevailing form is naviculoid, boat-shaped.

There have been various methods of classification proposed from time to time. In 1833 Kützing made three tribes based on the markings—Striatæ, Vittatæ, Areolatæ. About 1853 Rabenhorst, regarding the outline of the valve, divided diatoms into Annulares, Arcuatæ, Ovoideæ, Naviculares, Aciculares, Cuneatæ, Nodosæ.

Other writers propounded divisions based upon the position and arrangement of the endochrome in the frustule, or on the presence, absence, extent or persistence of a connecting membrane. These systems are obviously ineffective in the case of genera or species which occur only in the fossil state.

For many years the classification proposed by Professor H. L. Smith, an American diatomist, in 1872, and followed by

Van Heurck, De Toni, and most succeeding authors held the field. This divided the genera into three divisions :—

1. Rhaphidieæ, having on both valves, or at least on one, a true rhaphe, the fold or slit down the centre of the valve of which I have already spoken : the rhaphe joins two terminal nodules, hyaline thickenings of the valve, to the central nodule.

2. Pseudo-rhaphidieæ, having on both valves, or at least on one, a longitudinal clear space simulating a rhaphe.

3. Crypto-rhaphidieæ, having no rhaphe or pseudo-rhaphe on either of the valves.

In 1896 Schuett, writing in Engler and Prantl's Pflanzenfamilien, divided diatoms into Centricæ and Pennatæ, following Grunow's modification of Smith's classification. Grunow included the Rhaphidieæ and Pseudo-rhaphidieæ in one section under the name Bilaterales, and the Cryptorhaphidieæ he called Centrales. Schuett changed the names and has been followed by Mann and later writers. In the Centricæ the valves are arranged in relation to a central point, in the Pennatæ in relation to a central or median line.

Finally, in 1901 Mereschkowsky divided diatoms into Mobiles and Immobiles, basing his division on the presence or absence of the power of motion : in other words on the presence or absence of a rhaphe.

Considering that the divisions of the Centricæ and Pennatæ are fundamental, and in view of the fact that all the Centric diatoms are non-mobile, Schuett and West restrict the differentiation between mobile and immobile forms to the Pennatæ.

I have already mentioned some of the scientific uses of diatoms, but their direct and indirect influence in many industries is of very considerable importance. They have been called the grass of the sea, and are of great value as a fundamental food supply for the marine world. Out in the ocean, where sea-weeds do not grow, the diatom is the most prominent vegetation. This is especially the case in the Antarctic regions where animal life is almost entirely confined to the water. Because of the ever present and abundant supply of diatom food, the lower animal forms swarm in those waters, and carnivorous animal forms of larger bulk are consequently prolific. It is the same in the Arctic seas, which are rich in floating meadows of animalcules and microscopic plants; they are therefore rich in small crustaceans, which are very nutritious : they are therefore rich in fishes, as in the case of the Newfoundland banks : they are able therefore to support many kinds of seals, and upon these the polar bears feed. This sounds a bit like the House that Jack built, but I am not responsible for it : I am quoting a learned professor.

In other parts of the world also myriads of diatoms occur in the plankton, those minute forms of life, which exist on or just below the surface of the ocean and of large inland lakes : they form the chief support of the pteropods, medusæ and entomo-

stracans, which live in their company, and are also one of the principal sources of nourishment of mollusks, oysters, and holothuriæ, and salpæ. In our English seas in the spring and autumn there is an effervescence of microscopic plant life, mostly diatoms, and it has been suggested that possibly the great fluctuations in the number of young fish observed from year to year, may not depend wholly upon the number of eggs produced, but also upon the relation in time between the hatching of those eggs and the appearance in the water of diatoms and other phytoplankton upon which the larval fish depend for food, after the absorption of their yolk. Even if a brief interval occurs between the time when the larvæ first require extraneous nourishment and the period when such food is obtainable, it is highly probable that an enormous mortality would result. In that case even a rich spawning season might yield but a poor result in commercial fisheries for some time to come.

In fresh-water ponds and streams diatoms are of like account. They have been found in the stomachs of mosquito larvæ, small fish, tadpoles, and even in the excreta of snails.

The presence of diatoms in fresh water is generally a sign of its potability.

The direct application of diatoms to industrial uses is practically confined to forms belonging to fresh and brackish water. For the purpose of polishing they are superior to powders composed of amorphous silica : they are mixed in mineral pastes, soaps, and polishes for wood and metal and shell : they are also used in the manufacture of stucco, white lead, drain-pipes, enamel plaques, light tiles, etc. To this may be added their use in the manufacture of porcelain, and certain cements, and artificial stone. Bricks that float in water can be made of diatomaceous earth mixed with a small proportion of clay. Waterglass may be made of such earth, and at one time Sozodont tooth powder was composed mainly of diatom shells. Strabo and Vitruvius write of building-stones which would float, and Justinian instructed his architects to use them for the dome of Hagia Sophia in Constantinople. At the present day the earth from the diatom deposits of Jutland is used in the manufacture of light blocks and bricks.

Fossil diatoms washed and calcined have been largely used in the manufacture of dynamite, which is essentially nothing but nitroglycerine absorbed in the interstices of dried diatom earth, which serves to insulate in its tiny cavities minute particles of nitroglycerine in such a way as to render the liquid solid, and so to obviate the danger of explosion from shock.

The earth is also employed as an absorbent in the manufacture of colours, sealing wax, and erasers. Mixed in small quantities with rubber, it increases its strength and resiliency, but if an excess is used a very hard compound results.

Guano and river mud are most efficacious fertilisers of soil and usually contain a large proportion of diatoms.

Perhaps the most important application of diatoms is in the production of substances calculated to resist heat and to act as insulators. Light fire-bricks made of diatomaceous earth are used for the vaulting of furnaces and marine boilers, sound-proof partitions and ceilings, and for insulators of every description for electricity and heat and for cold storage plant; and the earth is used as packing for refrigerators, boilers and steam-pipes.

It will be seen that the economic use of diatomaceous earth is due to its various properties of abrasion, absorbency, solubility in alkaline solutions, low specific gravity, non-conductivity, and infusibility at ordinary temperatures. Another character is its extreme lightness and porosity : the latter quality permits of the use of the earth for filters adapted not only to the clearing of water but also of chemical solutions and serums.

The earth is also used in many countries by the poorest inhabitants as an admixture with food, apparently with the object of attaining a feeling of repletion after a too scanty allowance of nourishing material. In Lapland the " mountain meal " is mixed with ground corn and bark.

The artistic beauty to be seen in diatoms furnishes a field of design which has, I believe, never been exploited. The principles of the designs are in no way connected with the substance of which the valves are composed. Silica has its definite lines of crystallisation, but these figurings are not governed by them; and yet individual species hold their characteristics through unnumbered ages. An examination of the valves under the microscope will amply justify Mann's description of diatoms as the jewels of plant life : and I would add my own opinion that the lavish and exquisite elaboration of these lowly and infinitesimal forms constitute them, perhaps, the best of all " Sermons in Stones."

A final point to the credit of diatoms must not be overlooked; it is that the emulation of diatomists has been of the greatest service to microscopy : there can be no doubt that the endeavour to make visible the finer markings of diatoms, ranging in some instances to 100,000 to the inch, gave rise to a rivalry, which has worked marvels in the improvement of microscopes and lenses. Pelletan says that diatoms have contributed more to this improvement than all the rest of created nature.

I must record my grateful thanks to Mr. Dieselhorst for the beautiful slides he made for me to illustrate this paper.

" The Economics of Coal."

Abstract of a Lecture

By PROFESSOR W. A. BONE, D.Sc., Ph.D., F.R.S.

The richest coal is found in the Carboniferous System, but coal exists in almost all geological formations and in many parts of the world. There are extensive deposits in Canada, and in

Australia where, in places, seams of great depth are worked from the vertical surface face; and the Chinese coalfield would doubtless become of importance under more settled political conditions. Germany possesses large reserves of Brown Coal, an inferior grade, easily worked, in thick beds near the surface, and by her vigorous exploitation of these has almost retrieved her position in the coal trade, in spite of her loss of the Saar field, which yields a much better coal. But the bulk of the best coal reserves is divided fairly equally between the United States and the British Empire. Great Britain possesses the great advantage of an abundant supply of bituminous coal, the finest known for general industrial purposes, and it is estimated that our coal measures contain five per cent. of anthracite and 45 per cent. of bituminous coal. Some of the seams in America are 40 to 50 feet thick, taking 18 inches as the minimum for a working proposition, and it is only their comparative remoteness from the Eastern seaboard that prevents the export trade from exceeding that of Great Britain.

The growth of population in this country since Stuart times depended upon the coal industry in relation to the closely adjacent iron ore supply and the attraction to these districts of the world's raw materials; the successful development of our manufactures in the past has been due entirely to our cheap coal, and the future will hold little for us in this direction unless we can continue to command a low-priced supply. It was said by George Stephenson " The strength of Britain lies in her iron and coal beds. . . . . the Lord Chancellor now sits upon a bag of wool, but wool has long since ceased to be emblematical of the staple commodity of England. He ought to sit upon a bag of coal," and in 1865, writing on " The Coal Question," Professor Jevons remarked, " Coal in truth stands not beside but above all other commodities. It is the material source of the energy of the country, the universal aid, the factor in everything we do. With coal almost every feat is possible or easy; without it we are thrown back upon the laborious poverty of early times." And at the present time, in spite of the advent of petroleum, coal still retains its overwhelming supremacy as the world's fuel, and is likely to do so for many generations. Coal is our most important medium of exchange, for by its export we are able to import all our raw cotton, 80 per cent. of our raw wool, 50 per cent. of the iron ore smelted, all the raw copper, 95 per cent. of the zinc, 90 per cent. of the lead and 80 per cent. of the timber used in our factories and industrial establishments.

While England (normally) still maintains a large coal export trade, the decrease in the average output per annum per man is very disquieting. Comparing the two periods 1913 and 1924 we find an increase of 10 per cent (from 1,105 millions to 1,214 millions) in the number employed, but a decrease of 7 per cent.

(from 287 million tons to 267 millions) in the total output, and it may be noted that the average output per man in the United States is more than double that in Great Britain. To this must be added the larger comparative increase in the cost of production, partly as a result of the constant industrial unrest. In 1912 a strike was settled by Government intervention; 1917-18 saw the Sankey Commission and the 7 hours Act. Its advocates contended that output would not suffer, but the reverse took place, and the Act has only recently been repealed. In 1921 came the second strike and the settlement was again due to Government intervention, with a proposed division, after overhead charges, of net proceeds in the proportion of 87 to labour and 13 to capital, subject also to a minimum wage. By 1924 the average profit of 1s. 6d. per ton in 1913 had entirely disappeared, and after working the pits at a loss from January to July, 1925, there came the Government subsidy and the appointment of the Samuel Commission. When the subsidy ceased a third strike was declared and the whole trade of the country paralysed for many months. Between the years 1913 and 1924 the average wage cost increased by 91 per cent. and the total cost by 98 per cent.; the average earnings per man employed has increased only by 64 per cent. and the average output has diminished by 15 per cent., notwithstanding that twice as much coal was got by machinery in 1924 as in 1913 (50 million tons as against 24½ millions). As a result everyone concerned is dissatisfied; the miner because his earnings have not kept up with the increased cost of living, the owner because his undertaking shows no profits, the industrialist because coal is too dear, the exporter because his business has diminished, and the taxpayer because he has been called upon to subsidise an unprofitable industry.

It is clear that the present conditions are not likely to attract the capital so essential to the industry and therefore to the miners, or to offer a reasonable, clear profit, on the average, of 1s. 6d. to 2s. per ton raised. District settlements might reduce industrial difficulties, and the principle of minimum wage, if applied at all, should be subject to local variations. Reorganisation is required in the matter of inland distribution, and also in research work, which should be developed, but not, as at present, over-centralised; and fuel economy should be enforced by a national inspectorate and by compelling all large industrial consumers to employ duly qualified fuel technologists.

Obituary Notices.

Mr. Hubert Painter, B.Sc., F.C.S.

Born August 17th 1861.—Died December 12th 1926.

He was born at Didbrook in Gloucestershire where his father, George Painter, had a large farm and where he spent the early years of his childhood.

He was educated first at a preparatory school and afterwards at Queen's School, Basingstoke. Brought up among strictly religious surroundings he lived always a truly Christian life; but to one of his genial and tolerant disposition the Calvinistic Faith of his childhood proved repugnant, and being a man of deeply sincere and independent thought he became an Unitarian.

Throughout his life he was much interested in Philosophy, especially from the point of view of its correlation with Science.

After leaving school he migrated to London, where he entered upon his teaching career, and ultimately went to University College, whence he graduated as Bachelor of Science in 1895.

He had by this time considerable experience in teaching a wide range of subjects, which included Chemistry, Physics, Mathematics and Latin. He came to Bournemouth in the following year as Head Science Master in the Poole Hill and Drummond Road Schools of Science.

In 1899 he married Miss Lilian Hugill, the daughter of a Wesleyan Minister then living at Marlborough.

It was very largely owing to his exceptional teaching powers and unremitting labours that the two schools mentioned above, which were originally little more than evening continuation schools, grew in importance and became the nuclei of the Municipal College at Lansdowne which was opened in 1913.

The hope that he was to be the first Principal of that College was not realised, but it was characteristic of him that he continued to work with unremitting zeal for his students and absolute loyalty to his new chief, as Lecturer in Chemistry. In January, 1921, he was appointed to the post of Principal which he held until his death.

Our Society owes much to Mr. Painter. He was one of its founders, of whom there now remain only seven on the list of members. From the very first he was an active and hard-working member, and took the keenest possible interest in the welfare of the Society. He held the office of Chairman of the Physical Section from the foundation of the Society until his death, and every year gave one or more lectures with illustrative experiments. During his Chairmanship the Section was always an active one, both as regards lectures and excursions to the various industrial undertakings in the neighbourhood.

From 1912 to 1920 he edited the Proceedings of the Society, and the volumes themselves testify to the excellence of his work in this respect.

He was Chairman of Council for over two years, 1920-22. In 1924 he was elected President of the Society, and again in the following year; his Presidential Addresses, which are published in extenso in volumes XVI. and XVII. of our Proceedings, well repay reading and re-reading.

His lectures were invariably interesting and he had the power of making difficult and technical subjects comprehensible and even fascinating to his audience. His keen sense of humour was responsible for the real wit which was never absent from his discourses.

Besides the Natural Science Society, he was greatly interested in the promotion and success of the Bournemouth Literature and Art Association. This Association arose out of the embers of the Bournemouth Students' Association which had originally been formed in connection with the University Extension Movement. Mr. Painter was one of those who took an active part in the rise and development of the new Association on wider and more comprehensive lines than its predecessor, and as Deputy-Chairman of Council from the beginning he had a considerable hand in its guidance.

In spite of his exceptional intellectual gifts and extremely hard work, and notwithstanding the utmost frugality and careful living, he was, at the time of his death, a man poor in this world's goods. It says much for the regard in which he was held by all who knew him that the very considerable sum of over twelve hundred pounds was collected as a Memorial to him. This sum was devoted to the purchase of an Annuity for his widow. It is gratifying to record that the members of our Society have shown their appreciation of him by their most generous support of this Memorial.

Mr. Joseph Neale, B.A.

A real loss has been sustained by the death of Mr. Neale, which leaves another gap in the ranks of original members of the Society. His active co-operation ceased two years ago; but he had then been on the Council for 10 years; and for the last 7 years, as Chairman of the Entomological Section, he had carried on the work with infectious enthusiasm and intense enjoyment. He had made a special study of the protective colouration of insects, and an Abstract from his Paper on that subject will be found in Vol. XI of the Society's Proceedings; but his scientific pursuits had a wide scope. He had a considerable knowledge of ornithology, and was an excellent practical botanist, and, indeed, keenly

interested in wild life in general. Trained as a teacher, he had a natural gift of lucid exposition, and his lectures were full of vigour and of a racy gusto which never failed to captivate his audience. He was a delightful companion on a country ramble, alert and observant, and always ready to help those less skilled than himself.

Mr. George G. Grace, B.Sc., F.E.S.

The sudden death of Mr. Grace last year came as a shock to a very wide circle of friends whom he had made in the course of his lecture tours all over the country. He was a valued member of this Society for two years, 1916-1918, during which period he was the life and soul of the Entomological Section, in connection with which his name will be found in our lists of active workers; and he also exercised a strong influence on the welfare of the Society in the post of Chairman of the newly formed Library Committee. He published an important paper on " The Glacial Geology of Furness," but his main interest centred in the romance of insect life, and he had made a special study of Diptera, more especially the Chironomidæ, the fruits of which formed his last contribution to *The Naturalist.*

Historical Lists of Officers of the Society.

COMPILED BY THE LATE MR. R. A. DE PAIVA.

Presidents

1903-4	J. E. BEALE (Mayor of Bournemouth).
1904-5—1905-6 ...	G. E. J. CRALLAN, M.A., M.B., M.R.C.S.
1906-7	H. J. WADDINGTON, F.L.S.
1907-8—1908-9 ...	A. RANSOME, M.A., M.D., F.R.C.P., F.R.S.
1909-10	DR. A. SMITH WOODWARD, F.R.S., F.L.S., F.G.S.
1910-11	DR. DUKINFIELD H. SCOTT, M.A., F.R.S., F.L.S., F.G.S.
1911-12 — 1912-13	SIR E. RAY LANKESTER, K.C.B., M.A., LL.D., F.R.S., F.L.S.
1913-14 — 1914-15 —1915-16	SIR DANIEL MORRIS, K.C.M.G., J.P., M.A., D.SC., D.C.L., F.L.S.
1916-17	THE RT. HON. THE EARL OF MALMESBURY, D.L., J.P.
1917-18	SIR JETHRO J. H. TEALL, M.A., D.SC., LL.D., F.R.S.
1918-19 — 1919-20	FIELD MARSHALL LORD GRENFELL OF KILVEY, G.C.B., G.C.M.G., LL.D., F.S.A.
1920-21	LT.-COL. SIR DAVID PRAIN, C.M.G., C.I.E., F.R.S.
1921-22 — 1922-23	F. G. PENROSE, M.D., F.R.C.P., F.Z.S., M.B.O.U.
1923-24	SIR F. W. KEEBLE, K.B.E., D.SC., F.R.S.
1924-25 — 1925-26	HUBERT PAINTER, B.SC., F.C.S.
1926-27 — 1927-28	HEYWOOD SUMNER, F.S.A.

Vice-Presidents

1916-	H. BACKHOUSE, F.R.H.S.
1905-14	G. BROWNEN, F.C.S.
1906-	G. E. J. CRALLAN, M.A., M.B., M.R.C.S.
1921-25	FIELD MARSHALL LORD GRENFELL OF KILVEY, G.C.B., G.C.M.G., LL.D., F.S.A.
1904	E. HYLA GREVES, M.D., M.R.C.P.
1914-16	G. G. HAMILTON, F.R.C.S., F.R.H.S.
1910-12	C. J. HANKINSON, J.P.
1914-23	S. MCCALMONT HILL, D.C.L.
1905-20	J. E. LIDDIARD, F.R.G.S.
1904-	REV. E. F. LINTON, M.A., F.L.S.
1918-	CLAUDE LYON
1916-	SIR DANIEL MORRIS, K.C.M.G., J.P., M.A., D.SC., D.C.L., F.L.S.
1912-22	W. T. ORD, F.G.S.
1916-24—1926 ...	HUBERT PAINTER, B.SC., F.C.S.
1916-	F. G. PENROSE, M.A., M.D., F.R.C.P., F.R.S., M.B.O.U.
1909-21	A. RANSOME, M.A., M.D., F.R.C.P., F.R.S.
1907-18	MISS C. AGNES ROOPER
1904-8	W. SAVILLE-KENT, F.L.S., F.Z.S., F.R.M.S.
1916-	R. VOWELL SHERRING, F.L.S.
1918-25	REV. H. SHAEN SOLLY, M.A.
1905-11	A. W. THOMAS, M.D.
1905-16	J. ROBERTS THOMSON, M.D., F.R.C.P., J.P.
1905-14	H. J. WADDINGTON, F.L.S.

Chairmen of Committee

1904-5	J. ROBERTS THOMSON, M.D., F.R.C.P., J.P.
1905-6	J. E. LIDDIARD, F.R.G.S.
1906-7	H. J. WADDINGTON, F.L.S.
1907-10	W. T. ORD, F.G.S.

Chairmen of Council

1910-11	W. T. ORD, F.G.S.
1911-14	SIR DANIEL MORRIS, K.C.M.G., J.P., M.A., D.SC., D.C.L., F.L.S.

1914-Dec. 15 ...	G. G. Hamilton, M.A., F.R.C.S.
1916-17	Sir Daniel Morris, K.C.M.G., J.P., M.A., D.Sc., D.C.L., F.L.S.
1917-Feb. 19 ...	W. Munn Rankin, M.Sc., B.Sc.
1919-Mar. 20 ...	Sir Daniel Morris, K.C.M.G., J.P., M.A., D.Sc., D.C.L., F.L.S.
1920-22	Hubert Painter, B.Sc, F.C.S.
1922-27	J. H. Ralph Smythe, J.P.
1927-	Rev. C. O. S. Hatton, B.A., F.L.S.

Deputy Chairmen of Council

1911-14	G. G. Hamilton, M.A., F.R.C.S.
1914-Feb. 16 ...	Henry Backhouse, F.R.H.S.
1916 Mar.-Nov. 16	R. O'B. Furlong, C.B., J.P., M.A.
1916 Dec.-17 ...	W. Munn Rankin, M.Sc., B.Sc.
1917-19	F. G. Penrose, M.D,, F.R.C.P., F.Z.S., M.B.O.U.
1919-20	Hubert Painter, B.Sc., F.C.S.
1920-22	J. H. Ralph Smythe, J.P.
1922-27	Rev. C. O. S. Hatton, B.A., F.L.S.
1927-	J. H. Ralph Smythe, J.P.

Hon. Treasurers

1904-8	A. D. George.
1908-	G. Brumell, A.R.I.B.A.

Hon. Secretaries

1904-7	Miss C. Agnes Rooper and J. R. L. Dixon, M.R.C.S., L.R.C.P.
1907-8	J. R. L. Dixon, M.R.C.S., L.R.C.P., and H. Backhouse, F.R.H.S.
1908-10	J. R. L. Dixon, M.R.C.S., L.R.C.P., and Col. E. E. Markwick, C.B., C.B.E., F.R.A.S.
1910 Sept.-Oct. ...	J. Donkin, F.R.I.B.A.
1910-11	H. Le Jeune.
1911 Nov.-Feb. 1912	Sir A. Brooke Pechell, Bart., M.B.
1912 Apr.-Mar. 1914	T. Michell, M.I.C.E.
1914 Apr.-Oct. ...	R. A. de Paiva.
1914 Oct.-July 1917	R. A. de Paiva and T. Capper, M.A., B.Sc., Joint Secretaries.
1917 July-25 ...	R. A. de Paiva.
1925-26	R. A. de Paiva and Rev. A. G. Yates, M.A., R.N., Joint Secretaries.
1926-	Rev. A. G. Yates, M.A., R.N.

Hon. Assistant Secretaries

Apr. 1911-1912 ...	T. Michell, M.I.C.E.
May Mar. 1912-1914 ...	R. A. de Paiva.
1917-1918 ...	G. Grace, B.Sc., A.R.C.Sc.
1919-1920 ...	W. G. Boul, M.A., LL.D., D.C.L.
1920- ...	W. J. Woodhouse, A.C.P., M.I.H.

Hon. Financial Secretary

1905-8	J. H. Scott, M.E., M.I.M.C.E.

Assistant Secretary

1909-	J. F. Spencer.

Hon. Librarians

1908-1909 ...	A Scott, B.A.
1909-1911 ...	F. I. Cooke.
1911-1912 ...	W. Munn Rankin, M.Sc., B.Sc.

1913-1919 ... H. J. Ellis.
1919 Oct.-Mar. 1920 J. Omer Cooper, F.E.S.
1920 Mar.-Jan. 1921 Rev. C. O. S. Hatton, B.A., F.L.S.
1921 Jan.- ... Claude Lyon.
1923- ... ... Miss A. G. Veale, Hon. Assistant Librarian.

Hon. Editors

1911-12 ... ... G. E. J. Crallan, M.A., M.B., M.R.C.S.
1912-20 ... ... Hubert Painter, B.Sc., F.C.S.
1920-25 ... ... F. B. Taylor, B.A.
1925- ... ... J. R. White, M.A.

Hon. Curators

1917 Jan.-July 1921 W. G. Wallace.
1921-Dec. 1922 ... No Curator.
1923 Jan.-Nov. ... Rev. C. O. S. Hatton, B.A., F.L.S., and Howard Lacey, B.A
1923 Dec.- ... Rev. C. O. S. Hatton, B.A., F.L.S.

Chairmen of Sections.

Antiquarian

1904-7 ... ... A. W. Thomas, M.D., M.R.C.S.

Archæological and Historical

1907-8 ... ... A. W. Thomas, M.D., M.R.C.S.
1908-Feb. 14 ... G. Brownen, F.C.S.
1914 May-Nov. ... Rev. Canon T. E. Usherwood, M.A.
1914 Dec.-24 ... Rev. H. Shaen Solly, M.A.
1924-26 ... ... Col. J. R. Dodd, M.D., F.R.C.S.
1926- ... ... R. K. Cardew, B.A.

Deputy Chairmen

1922-24 ... ... Col. J. R. Dodd, M.D., F.R.C.S.
1925-26 ... ... R. K. Cardew, B.A.

Astronomical

1920-24 ... ... Col. E. E. Markwick, C.B., C.B.E., F.R.A.S.
1925-26 ... ... G. E. J. Crallan, M.A., M.B., M.R.C.S.

Mathematical

1921-22 ... ... W. H. Scott, M.A
1922-24 ... ... B. M. Peek, M.A., F.R.A.S.

Astronomical and Mathematical

1924-25 .. ... B. M. Peek, M.A., F.R.A.S.

Botanical

1904-5 ... ... Rev. E. F. Linton, M.A., F.L.S.
1905-7 ... ... J. F. Rayner, F.R.H.S.
1907-May 18 ... Miss C. Agnes Rooper.
1918-22 ... ... Rev. C. O. S. Hatton, B.A., F.L.S.
1922-26 ... ... Howard Lacey, B.A.
1926-27 ... ... Rev. C. O. S. Hatton, B.A., F.L.S.
1927- ... ... L. Beeching Hall, F.L.S.

Entomological

1914-15	R. Beck, F.E.S.
1915-Dec. 19 ...	F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.
1920-Jan. 26 ...	J. Neale, B.A.
1926-	Howard Lacey, B.A.

Geographical

1908-10	J. E. Liddiard, F.R.G.S.
1910-11	A. Scott, B.A.
1911-16	G. de Castro, M.R.C.S.
1916-	Claude Lyon.

Geological

1904-5	Rev. G. D. Shenton, B.A.
1905-6	The Marquis de Trevelec.
1906-14	W. T. Ord, F.G.S.
1914-17	W. Munn Rankin, M.Sc., B.Sc.
1917-18	H. Kidner, F.G.S.
1918-20	W. Munn Rankin, M.Sc., B.Sc.
1920-23	W. J. Woodhouse, A.C.P., M.I.H.
1923-	Henry Bury, M.A., F.L.S., F.G.S.

Photographic

1905-8	Councillor R. Y. Banks.
1908-10	C J. Hankinson, J.P.
1910-12	E. W. Barlow, F.R.A.S.
1912-13	G. Brumell, A.R.I.B.A.
1913-14	No Chairman.
1914-16	R. Y. Banks.

Photographic and Record

1916-25	R. Y. Banks.
1925-	W. Dieselhorst, A.M.I.C.E.

Physical

1904-26	Hubert Painter, B.Sc., F.C.S.

Deputy Chairman

1926-27	G. E. J. Crallan, M.A., M.B., M.R.C.S.

Zoological

1904-8	G. E. J. Crallan, M.A., M.B., M.R.C.S.
1908-10	A. W. Thomas, M.D., M.R.C.S.
1913-14	W. Munn Rankin, M.Sc., B.Sc.
1922-	F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.

Microscopical

1909 Mar.-10 ...	J. R. L. Dixon, M.R.C.S., L.R.C.P.
1913-14	H. B. Wells, F.R.M.S.
1922-	F. B. Taylor, B.A.

Zoological and Microscopical

1910-11	H. B. Wells, F.R.M.S. A. W. Thomas, M.D., M.R.C.S.
1911 Mar.-12 ...	G. E. J. Crallan, M.A., M.B., M.R.C.S.
1911-13	H. B. Wells, F.R.M.S.
1914-16	T. B. Goodall, F.R.C.V.S., F.L.S.
1916-22	F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.

Elected and co-opted Members of Council.
Title changed from Committee in 1910.

Many of these also had seats on the Council ex-officio either before or after their election or co-option. Their names are marked*

1905-7	Atkins, Dr. F.
1906-7—1908- ...	*Backhouse, H., F.R.H.S.
1914-15	*Banks, R. Y.
1905-6	Bax, P. B. Ironside.
1904	Bond, Dr. Eleanor.
1919-20	Boul, Mrs.
1904-8	*Brownen, G., F.C.S.
1906-8	*Brumell, G., A.R.I.B.A.
1906-8	Buckland, Dr. Frank.
1921-22	Cardew, R. K., B.A.
1909-11	Chandler, S. Whitty, B.A.
1905-6	Clements, Lt.-Col. W. G.
1904	Clift, Dr.
1921-	Curme, Mrs.
1905-10	Curtis, W. Parkinson, F.E.S
1923-26	*Dodd, Col. J. R., M.D., F.R.C.S.
1914-16	Druitt, J., J.P.
1916-17	Dyer, J. Herbert.
1919-25	*Ellis, H. J.
1910-	French, J. M.
1914-17	Furlong, R. O'B., C.B., M.A.
1919-Aug. 21 ...	*George, A. D.
1904	Giles, Dr.
1904-6	*Goodall, T. B., F.R.C.V.S., F.L.S.
1918-20	Gosse, W., M.D., D.P.H.
1921-23	Gray, Arthur.
1910-15	Hamilton, G. G., M.B., F.R.C.S.
1916-18— 1922-23	Hatton, Rev. C. O. S., B.A., F.L.S.
1911-16	Hill, S. McCalmont, D.C.L.
1926-	Hurry, J. B., M.A., M.D.
1916-19	Jeffery, T. J. P.
1906-10 — 1911-18	*Le Jeune, H.
1926-	Longbottom, F. W., F.R.A.S.
1914-16	*Lyon, Claude.
1907-8	*Markwick, Col. E. E., C.B., C.B.E., F.R.A.S.
1907-8	Maude, W. C., J.P.
1910-16	*Morris, Sir Daniel, K.C.M.G., J.P., M.A., D.Sc., LL. D., F.L.S.
1910-11	*Michell, T., M.I.C.E.
1916-19	*Neale, Joseph, B.A.
1905-6	*Ord, W. T., F.G.S.
1904	Parish, Miss
1915-16	*Penrose, F. G., M.D., F.R.C.P., F.Z.S., M.B.O.U.
1917-18	*Rankin, W. Munn, M.Sc., B.Sc.
1904	Reid, C. J.
1919-	Rooke, Miss S. G.
1918-19	Rothwell, Mrs.
1908-9	Scott, A., B.A.
1908- ...	*Scott, J. H., M.E., M.I.M.C.E
1904-26	Sherring, R. Vowell, F.L.S.
1920-26 — 1927-	Simpson, Rev. E. J. Douglas, M.A.
1916-	Smythe, J. H. Ralph, J.P.
1923-	*Spencer, J. F.
1905-10	Stubbs, G. M.
1918-20	*Taylor, F. B., B.A.
1921-23	*Wallace, W. G.
1907-10	*Wells, H. B., F.R.M.S.
1906-7 — 1916-20 1923-	*Woodhouse, W. J., A.C.P., M.I.H.

Various Committees

Chairman: Rev. C. O. S. Hatton, B.A., F.L.S.

1915 Dec.-
Oct. 1919 General Policy of the Society.
1919 Nov.-
Feb. 1920 Housing.
1920 Feb.-
Oct. 1922 Housing and Finance
1922- ... Finance and General Purposes.

Library Committee

Chairmen

1918 Mar.-
Oct. 1918 G. G. Grace, B.Sc., A.R.C.Sc.
1918 Nov.-
Oct. 1919 Hubert Painter, B.Sc., F.C.S.
1919 Nov.- ... Rev. C. O. S. Hatton, B.A., F.L.S.

Museum Committee

Chairmen

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